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Number 10

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# Journal of Forestry


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*Photo courtesy American Forest Products Industries, Inc.*

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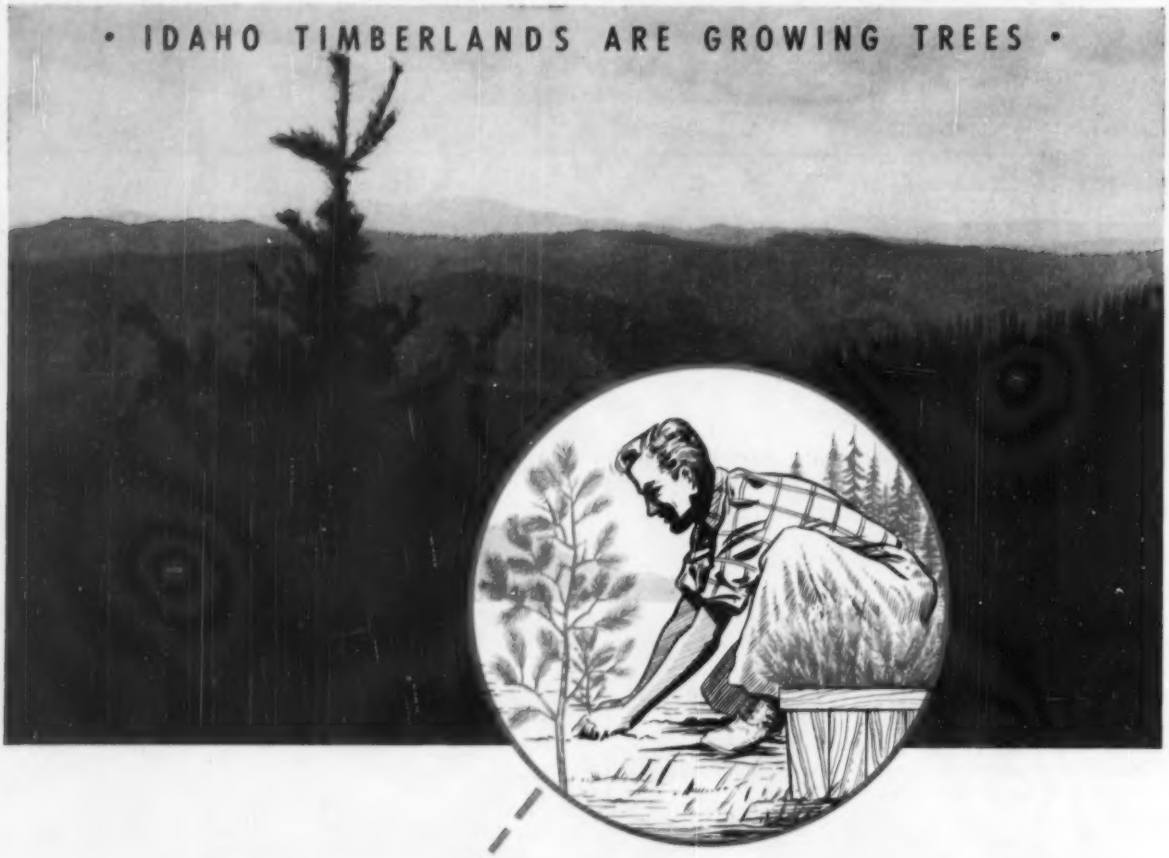
• IDAHO TIMBERLANDS ARE GROWING TREES •



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# Hunting Seasons and Forest Fires in Colorado

**Ralph R. Hill, and Erwin L. Boeker**
Forest Service, U. S. Department of Agriculture, and Colorado Game and Fish Department

Most of the elk and about one-half of the deer killed in Colorado are hunted on the 14 million acres of national-forest land within the state. Eleven national forests include much of the high mountainous and forested portion of the western half of the state. The Colorado Game and Fish Department which administers the wildlife resources, and the United States Forest Service which is responsible for administration of the national forests, have a mutual concern in the welfare of the wildlife and its habitat. For many years the two agencies have cooperated in carrying out their respective and closely related responsibilities.

The damaging effects of uncontrolled fires upon wildlife and the land are generally recognized. On the other hand, considerable damage can result from uncontrolled big-game herds, and it is important that a planned and adequate game harvest be taken each year. Therefore the Game and Fish Department and the Forest Service have a mutual interest in the prevention and supression of fires, and in the management of big-game herds. The problem is to assure an adequate hunter harvest by such means as are consistent with the protection of basic land resources, and with the recreational objectives of wildlife management.

Two successive years of subnormal precipitation, particularly during the summer and early autumn seasons of 1952 and 1953, made foresters apprehensive of the influx of 100 thousand hunters to the mountains. Citizens of the state, who have through years of fire prevention effort become aware of the importance of protecting watersheds from fire, were deeply concerned. Pressures were exerted to have big-game hunting seasons delayed until emergency conditions abated, and the Colorado Game and Fish Commission did postpone seasons in some areas. However, these emergency postponements worked hardships on some resident and most non-resident hunters as well as the hotels, cabin camps, dude ranchers, and outfitters.

Recognizing the highly unsatisfactory conditions developing from uncertainty as to hunting season opening, and the need to set firm dates in the future, a joint study was undertaken by the Game and Fish Department and the Forest Service. The authors were assigned to this task, and have here summarized the more pertinent facts and conclusions developed by the study. The assistance of Gilbert N. Hunter, game manager for the Colorado Game and Fish Department, and Roy L. Williams chief of Fire Control for the Rocky Mountain Region, U. S. Forest Service, is gratefully acknowledged.

## Hunter Fires

Over the eleven-year period, 1943 to 1953, hunters have been responsible for 303 forest fires (11 percent of all fires, but 20 percent of all man-caused fires) on the national forests of Colorado. These fires burned 1,825 acres (18 percent of the acreage burned by all fires). For all national forests of the state there has been an average of about one fire to each 2,500 hunters in the woods, or 0.4 fires per thousand hunters. By years, the number of hunter fires has varied from a low of 4 fires (less than 0.1 fires per thousand hunters) in 1947 to a high of 101 fires (0.9 fires per thousand hunters) in 1952. The fires originated from smoking and camp fires (including warming fires) in about equal numbers.

The national forests of Colorado may be grouped by somewhat comparable zones as eastern slope (Roosevelt, Pike, San Isabel, Rio Grande), western slope (Routt, Arapaho, White River, Grand Mesa, Uncompahgre, Gunnison), and southwest (San Juan). By groups of forests the occurrence of hunter fires varied from 0.2 per thousand hunters on the western slope, and 0.6 on the eastern slope, to 1.2 in the southwest. Obviously the conditions vary geographically, with the San Juan presenting special problems. The six western slope forests are visited by 70,000 hunters, the four eastern slope forests by 20,000, and the San Juan by about 10,000—nearly three times the number of hunters using the national forests in 1943. For the state as a whole, about 15 percent of the deer hunters are non-residents, but by zones non-residents make up nearly 30 percent in the southwest, 20 percent on the western slope, and only 6 percent on the eastern slope. Perhaps the relatively high percentage of non-resident hunters is a factor in the San Juan problem; at least the possibility is further supported by the record of convictions for failure to extinguish campfires—4 out of 5 cases in 1952 involved non-resident hunters.

The acreage burned by hunter fires, with two exceptions, has been relatively small. More than half of the total acreage burned in the eleven-year period resulted from

TABLE 1.—AVERAGE DAILY MAXIMUM AND MINIMUM TEMPERATURES
(Degrees Fahrenheit)

| | | Sept. 1 | Oct. 1 | Nov. 1 | Dec. 1 |
|---|---|---|---|---|---|
| Eastern slope | Maximum | 85 | 78 | 68 | 55 |
| | Minimum | 40 | 31 | 23 | 10 |
| Western slope | Maximum | 84 | 76 | 64 | 46 |
| | Minimum | 35 | 30 | 19 | 1 |

TABLE 2.—FIRE DANGER RATINGS AND HUNTER FIRES
(San Juan, October 16-31)

| Year | Number of days fire danger Reached high-moderate | Number of hunter fires Total | Exceeding ¼-acre |
|---|---|---|---|
| 1944 | 2 | 0 | 0 |
| 1945 | 3 | 1 | 0 |
| 1946 | 4 | 4 | 1 |
| 1947 | 3 | 1 | 0 |
| 1948 | 3 | 5 | 2 |
| 1949 | 0 | 2 | 0 |
| 1950 | 14 | 22 | 9 |
| 1951 | 7 | 20 | 7 |
| 1952 | 15 | 32 | 9 |
| 1953 | 0 | 2 | 0 |

two fires—one of 720 acres on the Rio Grande in 1952, and one of 285 acres on the Roosevelt in 1943.

Of all fires originating between October 6 and October 31[1] hunters were responsible for about 80 percent on the western slope and southwest, but for only one-half on the eastern slope forests.

### Precipitation

Total annual precipitation is not a good indicator of burning conditions during any particular time of the year, but it is of interest to note that for the 10-year period, 1943-1952, only two years, 1946 and 1947, were above the 20-year average of 16.5 inches.[2] The years of 1950 with 11.5 inches, and 1952 with 13.3 inches were exceptionally low.

Snowfall is important both in reducing fire danger and in facilitating hunting—up to the point that it interferes with travel and stimulates an exodus of game and hunters. Frequency of snowfall in amounts exceeding one inch in depth was determined by 5-day periods. Unfortunately data on snow-depth on the ground were not available. Likewise, many of the Weather Bureau Stations are located at altitudes lower than the surrounding hunting territory, and hence receive less snowfall. The odds of receiving a snowfall of one inch or more rise from 1 in 40, October 1-5; to 1 in 30, October 10-15; to 1 in 6, October 20-25; and to 1 in 4, November 1-5.

Snowfall in excess of 12 inches was considered to be a material hindrance to hunting. Lacking records from Weather Bureau Stations in the mountain area, the analysis was considered to be not representative. It is known. however, that in 1946 and 1953 on the Uncompahgre and White River plateaus snow reached sufficient depth during the hunting season to drive most hunters from the woods.

### Temperature

Average daily maximum and minimum temperature records were obtained from several Weather Bureau Stations near national-forest areas. Representative readings are given in Table 1.

### Fire Danger Ratings

A valuable indicator of burning conditions is the fire danger rating determined from measurements of such factors as wind velocity, relative humidity, fuel moisture, time interval since effective rain, evaporation, and air temperature. One or more fire danger stations are maintained on each national forest. Fire danger ratings reflect the probable rate of spread of fires, and to a lesser extent the likelihood of fires starting. Fires can be started when the danger rating is low, but they can usually be held to small size. Critical burning conditions of the year usually occur in June, September, and October, although July and August may show more fires because of the greater frequency of lightning storms.

There is an important difference between spring and autumn readings, however, reflecting the period during the day when mid-day ratings are applicable. Normally fires burn slowly at night. The longest days of the year occur in June, and fires that do start have a long burning period. In contrast, October days are four hours shorter and nights usually colder. A fire that starts in October has less chance of being a "big" fire than one that starts in June—but the 720-acre fire on the Rio Grande shows that high winds can upset this generality. Fire danger rating scales currently in use do not take into account the factor of length of day.

For a few selected stations, fire danger ratings over the past 10 years were analyzed. The San Juan ratings indicate a close correlation between the number of days of high fire danger ratings and the number of hunter fires. These data are shown in Table 2.

The records of several fire danger stations in each zone were analyzed to determine whether later opening dates would reduce the expectancy of high fire danger days during the hunting season. Beginning with 1948 (and excepting emergency postponements in 1952 and 1953) the regularly established hunting season has been October 15 for the western slope, southwest, and Rio Grande, and October 20 for the eastern slope north of the Rio Grande. On those dates the probabilities were four out of ten that high fire danger ratings would be reached and earlier in the month the probabilities were even higher. By delaying the opening dates to October 20 on the western slope, and to November 1 on the eastern slope and San Juan, the probabil-

[1] This period includes the major hunting pressure and the days prior to hunting season when hunting camps were being established.

[2] This is the average of 9 selected Weather Bureau Stations.

ities would be reduced to two out of ten. One year's experience is not conclusive, but with an October 24 opening date in 1953 the number of fires per thousand hunters dropped to less than 0.1 and the acreage burned was insignificant. Without consideration of burning conditions, the records of past years could be misleading, because it is a fact that numbers of hunter fires were not exceptionally high from 1943 to 1947 when hunting seasons opened earlier than October 15. However, those were years of near-normal or above-normal precipitation, and not representative of the drought years which are a recurrent, but somewhat unpredictable, certainty.

Using the Durango (San Juan) fire danger records as an example, Figure 1 indicates the downward trend in occurence of high fire danger ratings from September 26-30 to November 1-5.

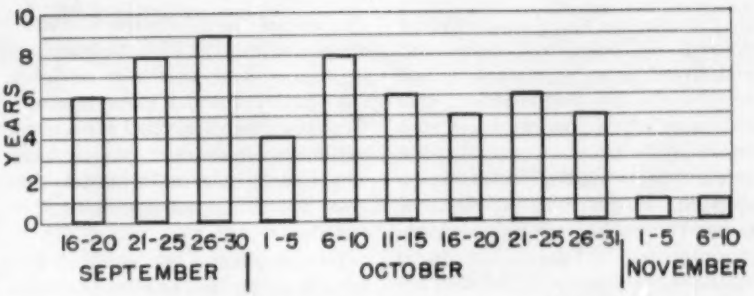


Fig. 1.—Number of years during 10-year period 1944-1953 that Durango fire danger ratings reached 65 during 5-day periods indicated.

### Hunting Conditions

In considering hunting seasons and forest fires, the common practice of setting up hunting camps several days prior to the opening of the season cannot be overlooked. The records show a few pre-hunting season fires.

Big-game hunting brings to the woods many indoor workers who enjoy putting up with a degree of camp cooking, sleeping on the ground, and cold weather—but not too much. More than one-fourth of all resident deer hunters live in Denver and its suburbs; more than one-half come from 9 eastern slope counties which include all but one of the larger cities of the state. Few are equipped, physically or materially, for rigorous hunting weather. A majority prefer the milder weather of early big-game seasons even though hunting may be less successful. Whether the colder weather of later hunting seasons would result in more warming fires (and hence more forest fires), or whether lower fire danger ratings would offset that tendency, have not been determined.

Regardless of weather conditions about 60 percent of the total deer kill and 75 percent of the total elk kill occur during the first week of the open season. Probably this is a reflection of the numbers of hunters in the woods. However, it is generally recognized that damp weather, or a moderate amount of snow, makes hunting easier and more successful. In general, the later the season the greater is the likelihood that there will be favorable moisture conditions, or snow. On the other hand, the later the season the greater is the possibility of discouraging snows exceeding a foot in depth, such as have occurred on the 10,000-foot-altitude plateaus of the Uncompahgre and White River. Such snows usually scare the hunters out. With a season ending by November 15, the odds are low of having a one-foot snowfall below 9,000 feet in elevation.

Meat spoilage is a factor that has been used in reasoning against early hunting seasons, and it has been shown that maximum daily temperatures drop 10 degrees or more between October 1 and November 1 (Table 1). However, it is generally conceded that hunter-skill and experience are more important to proper handling of meat than is the temperature. All things considered, a late season helps in the proper handling of meat.

Popular opinion in Colorado favors a deer hunting season prior to the rut which begins in November. Assumption is that the meat of bucks, particularly those older than yearlings, killed during the rut is unpalatable. This assumption is not borne out by experience of many hunters, nor by the studies of Cook, *et al*, in California.[3] During the November and December 1952 seasons in Colorado, hunters having the option of killing deer of either sex took as many bucks as does.

Proposals have been made to delay final setting of the big-game hunting seasons until late in the year. This is unsatisfactory for the hunters who have to arrange for time off from their jobs, for camp accommodations, and sometimes for horses and guides. Outfitters and hunters like to confirm their reservations several months in advance of the hunting season. Business concerns in metropolitan areas must schedule their employees, hunting season leave in ways that will least disrupt production. When it is considered that at least one-fifteenth of the state's population engages in big-game hunting, and nearly 20 thousand non-residents come to the state for that purpose, the importance of early settlement of firm dates for the hunting season can be appreciated. Notwithstanding recent improvement in long-range weather forecasting, it is not feasible now to establish hunting seasons on the basis of seasonal forecasts. However, analysis of records of the past can be used as an indicator of fire-danger probabilities.

### Postponements

Because of the dry weather and high fire danger prevailing in 1952, an indefinite (finally 16-day) postponement of the big-game season

[3]Laughlin, John. Report on southern California's January deer season. California Game and Fish, Volume 39, No. 4, October 1953.

on the eastern slope was effected through an emergency Game and Fish Commission regulation. Final decision for the postponement was not made official, in the hope of a break in the weather, until the day before the originally scheduled opening. However, newspaper and radio releases concerning emergency conditions had given the public some forewarning of impending action. At the same time, a regional forester's order closed eastern slope forests to human use during the emergency.

Somewhat similar burning conditions in 1953 led to postponement to October 24 of the established October 15 opening on the western slope and October 20 opening on the eastern slope.[4] Public notice of this change was given on October 5. Many non-resident hunters who had planned to hunt in Colorado went to Utah or Wyoming where seasons were open without postponement. Colorado non-resident deer license sales fell off 20 percent from 1952 to 1953, while sales in Utah went up 34 percent, and Wyoming sales went up 10 percent. Loss of revenue to the Colorado Game and Fish Department from the drop in non-resident deer and elk license sales (4,053 licenses) amounted to $172,000. Hotels, cabin camps, and outfitters suffered financially. From a game management standpoint, several areas overpopulated with deer would have benefited by a greater hunter harvest, to which non-residents contribute.

In emergencies the regional forester is authorized to close national-forest areas to public use. However, with a state-wide average of 10 percent non-federally-owned land within the national forest boundaries (27 percent in the case of the Roosevelt National Forest), and innumerable points of entry, the enforcement problem is nearly insurmountable. An alternative, but more expensive approach, would be to expand or extend the employment period of emergency fire forces within the Forest Service organization. Obviously, this approach involves some "calculated risks," but it may be a necessary complement to multiple-use management.

### Conclusions

Many factors are involved in the establishment of hunting seasons; some favor an earlier date and others a later date. Obviously, any decision reached must be a compromise. Analysis of the fire problem should aid in reaching an intelligent decision.

Strictly from the standpoint of fire suppression, a hunting season opening 5-10 days later than the recent dates of October 15-20 would reduce the probabilities of large fires occurring. Regardless of how late the hunting seasons might be set, in some years and in some places high fire-danger ratings will be encountered. On the basis of acreage burned, the records of the past eleven years are not alarming. The fact that fires have started on days of high fire danger without reaching large size is a credit to the fire suppression organization.

The trend in future hunting pressure is conjectural. For the past 20 years there has been a general rising trend to deer hunting license sales, rapid between 1942 and 1951, but much less rapid thereafter. If the number of hunters continues to increase, there is reason to expect an increase in the numbers of hunter fires in the future. Later hunting seasons would tend to lower the rate of increase, but could not be expected to eliminate the occurrence of all hunter-caused forest fires. Several other factors favor early hunting seasons.

Public education, directed toward reduction of man-caused fires, with organized sportsmen assuming more responsibility than they have in the past, deserve greater effort on the part of the Forest Service and the Game and Fish Department.

[4]The 5-day delay in opening on the eastern slope developed in 1950 primarily as a game management measure to encourage hunting on overpopulated deer ranges of the western slope. It has been learned that hunters tend to go where seasons open early.

### Seventh Spruce Budworm Control Project Completed

Aerial spraying to control the spruce budworm, *Choristoneura fumiferana* (Clem.), in the fir forests of Oregon and Washington has been an outstanding example of cooperation by private, state and federal agencies. Spraying has been done annually since 1949. The seventh consecutive project in this program, recommended by the Northwest Forest Pest Action Committee, started on June 27 and was completed on July 21, 1955. Some 621,000 acres were treated by contract sprayers on four control units under the administrative direction of the Oregon State Board of Forestry and the U. S. Forest Service. The Pacific Northwest Forest and Range Experiment Station provided technical supervision.

A total of 53 spray planes, mostly of the Stearman type, were used this year. Mortality of the budworm following spraying ranged from 79.0 to 100 percent on individual spray blocks and averaged 96.9 percent for the entire project. The retarded, cold, wet spring and the consequent uneven development of the budworm larvae made the timing of the spraying operations very difficult; however the final results were quite satisfactory. Although there were several plane accidents, only one pilot was injured on the project.

During the entire 7-year spraying program, 3,840,000 acres of epidemic infestations have been successfully treated at an average cost of $1.05 per acre and an average mortality of 98 percent.

# How Forest Pests Upset Management Plans in the Douglas-fir Region[1]

**Royce O. Cornelius**
Assistant managing forester,
Weyerhaeuser Timber Company,
Tacoma, Washington

SEVERAL YEARS ago I was with a group of foresters visiting an operation in northwestern Oregon. In response to a question about his logging plans the logging superintendent replied emphatically, "We don't make logging plans anymore —the wind and bugs make them for us." Today this statement could well be applied to most operations in the Douglas-fir region, but we are demonstrating that the problem can be met.

Where this region was once considered relatively free of major insect problems, we no longer operate on a business-as-usual basis. Last year epidemic infestations were recorded on over eight million acres in Oregon and Washington, or approximately 17 percent of the total forested area of the two states. Forest insect problems have become an important part of everyday business, and management plans must be adjusted accordingly. Although less spectacular than forest fires, insects and diseases take a terrific toll. The best estimates available indicate that the timber killed annually by insects and diseases exceeds two billion board feet, or one-fifth of the yearly log production of the two states.

Since forest pests show no respect for property lines, cooperative action by all forest organizations is essential to successful surveys and control measures. The Northwest Forest Pest Action Committee, composed of industrial, state, and federal representatives, has been actively working since 1948 on insect and disease problems. This work has been further strengthened by active subcommittees working on the spruce budworm, Douglas-fir beetle, insect and disease research, and silver fir beetle. A subcommittee on forest diseases is being formed and another on animal damage is under consideration. These committees have done a very effective job in unifying action on forest insect and disease problems and in promoting the control of destructive forest pests in the region. At the same time committee action has extended the effectiveness and coverage of the technical entomologists and pathologists in the region.

The broad term "forest pests" includes not only insect and disease outbreaks and windthrow, but mice, rodents, and other wildlife damaging forest crops. Some foresters might even insist on adding certain sportsmen, trespassers, and others to the list. It is desirable, therefore, to review some of the major forest pests and discuss their effect on forest management plans.

Forest insects and windthrow, which is often the forerunner of insect epidemics, are the most destructive, causing far greater losses than other forest pests.

### Douglas-fir Beetle
### *(Dendroctonus pseudotsugae)*

Currently the Douglas-fir beetle is the most serious insect pest in the forests of the Pacific Northwest. This is not a new insect pest to the region, but one which had not been considered a serious problem prior to 1950. Normally, this bark beetle breeds in freshly cut, fire-killed or blow-down Douglas-fir timber. Although it does not commonly attack live timber, heavy blowdown caused by winds during the winter of 1949-50 favored an increase in the beetle population to epidemic proportions, resulting in heavy kill of live trees.

The quantity of blow-down timber was further increased by recurring strong winds in the winters of 1951 to 1953. This blow-down timber alone created a major salvage problem in the region. At the same time it favored increased beetle activity and expansion of the epidemic.

The total mortality to the fall of 1954, located principally in Oregon, is estimated at 15 billion board feet, of which 11.5 billion board feet is blow-down and 3.5 billion board feet is beetle kill. Obviously, this has upset management plans in many portions of the region, with both public and private lands being affected.

To expedite action on the beetle-blow-down problem, a Douglas Fir Beetle Subcommittee of the Northwest Forest Pest Action Committee was formed to obtain and disseminate information and coordinate action. Under the general sponsorship of this group a succession of regionwide surveys was undertaken, new techniques were developed for rapid mapping from the air, maps and survey information were widely distributed, and attention was focused on the need for forest access roads and prompt efforts to recover the high timber values at stake. Today the results of this effort are in evidence throughout the region in the form of new forest access roads and timber from beetle infested areas streaming to market.

The Douglas-fir beetle has been especially aggressive in the Oregon Coast Range between the Siuslaw and Umpqua Rivers, including Smith River, and in the Millicoma and Coos River drainages. The Bureau of Land Management currently has under contract 90 miles of access road in Smith River to reach three billion board feet of merchantable timber, of which about half a billion board feet is windthrow and beetle kill. The headwaters of Smith River is one of the most critical areas of blow-down and beetle-killed timber in the region.

How has this affected management plans? It has meant changes in development plans, harvesting in excess of the allowable cut, and an increase in the fire hazard. From low priority for development, this area has been moved to top priority and most of the access road money available has been channeled into this one area. To complete this timber recovery job, the allowable cut must be exceeded. This will

[1]Presented at the 45th Western Forestry Conference, San Francisco, Calif. December 9, 1954.

result in a lowered cut in the area at a later date. Another effect is the terrific fire problem created by the concentrations of down material and snags. Careful fire precautions at increased cost will be required to prevent a major conflagration from further upsetting management plans in this area.

Similar problems have been created on the Millicoma Forest, a Weyerhaeuser tree farm near Coos Bay, Oregon. Often referred to by entomologists as a "bark beetle pasture," this forest area has been subject to the brunt of an epidemic beetle population since the 1949-50 windthrow set the stage for the beetle to go on the rampage. To meet this situation mill production schedules were increased, the woods organization expanded, and the logging road construction program doubled. Based on intensive aerial surveys, the primary road construction has been directed toward the areas of heaviest infestation. Two full time entomologists added to the forestry research staff have devoted most of their time to studies of the beetle and to work with the local foresters and loggers in selecting high priority areas to be harvested. At the same time large scale colored aerial photographs have proven an effective tool to plan logging for removal of the maximum amount of salvage material. The loggers and foresters on this tree farm are concentrating first on putting as many beetle infested logs in the water as possible, second on planned right-of-way felling to minimize beetle population buildups where infested logs cannot be quickly removed, and third on salvage to reduce deterioration losses. Approximately one-fourth of all log production is beetle killed or windthrown timber.

In general the trend of the Douglas-fir beetle infestation in the region is downward. Future efforts must be directed chiefly toward salvage to prevent losses through deterioration. As an example, salvage sales on B.L.M. lands now represent 80 percent of all sales and better than 50 percent of the volume harvested is salvage material. Of an estimated three billion board feet of beetle kill and blow-down on B.L.M. lands over three quarters of a billion has been sold to date. Under the U.S. Forest Service salvage program approximately one billion board feet of blow-down and beetle-killed timber has been harvested since 1950. The public agencies and the forest industry have been tackling this tremendous salvage job in a cooperative manner which augurs well for the continued success of this difficult undertaking.

### Silver Fir Beetle (Pseudohylesinus)

The silver fir beetle outbreak now covers 650,000 acres, primarily in the state of Washington. Practically all of the merchantable silver fir in some stands is dead. This is a real loss of raw material to the pulp industry in portions of the region. Some areas of heaviest damage have suffered three year losses in excess of 90 percent of the original volume of silver fir. Most centers of serious damage are in merchantable stands of mature and overmature timber. Investigations show that both Pseudohylesinus bark beetles and Armillaria fungi are involved in killing of silver fir. On 146,000 acres the fir gout caused by the balsam woolly aphid (*Chermes* spp.) presents a new problem closely allied with the silver fir beetle attacks.

The Silver Fir Beetle Subcommittee investigating these complicated relationships has undertaken evaluation surveys, trend plot establishment, biological studies of the beetle, deterioration studies, and investigations of market and salvage possibilities. Preliminary studies indicate that standing mature trees must be utilized for lumber within four or five years after death; somewhat more time is allowable for salvage for pulpwood. Of necessity, vigorous timber recovery programs have been launched by state and federal forest agencies. These involve revising management plans and expediting salvage sales in areas of heavier damage. At the same time private companies, such as Puget Sound Pulp and Timber Company at Bellingham, have found it necessary to completely revise road development and logging plans. The Weyerhaeuser Timber Company is facing a similar problem on the St. Helens Tree Farm. After special detailed aerial surveys and ground checks delineated the problem areas, logging priorities were assigned based on rate of deterioration. Logging plans and the road construction program have been drastically altered, and engineers are now laying out road networks in areas formerly reserved for development many years in the future.

Certainly the silver fir beetle has done its share in reducing the mature timber resource of the Douglas-fir region and in disrupting management plans.

### Spruce Budworm (*Choristoneura fumiferana*)

The spruce budworm has been epidemic in Oregon and Washington since 1944. Spraying begun in 1949 has controlled the budworm and protected the fir timber on three and a quarter million acres at an average cost of about one dollar per acre. This well organized and highly successful spray program has been one of the most effective forest insect control projects ever undertaken in this country. In western Oregon where a large part of the Douglas-fir wood using industry's resource was seriously threatened, epidemic infestations have been eliminated and tree killing has been prevented.

Infestations have also been eliminated from the eastern Cascades area in Oregon adjacent to the Douglas-fir region. The Spruce Budworm Subcommittee has recommended that 600,000 acres be sprayed in eastern Oregon in 1955 in an attempt to achieve substantially complete control of the epidemic in the commercial timber area west of the summit of the Wallowa Range.

Being ever mindful of the destructive potentialities of this defoliator, foresters in the Douglas-fir region cooperate each spring in a spruce budworm survey aimed

at early detection of any buildup or infestation by this insect. Through this concerted detection and control program foresters hope to prevent the budworm from disrupting management plans. So far they have been successful, but at considerable cost.

### Other Forest Insects

Other forest insects include the hemlock looper, a periodically destructive insect kept under careful surveillance by annual surveys and the Engelmann spruce beetle, which is active on the Snoqualmie National Forest, where salvage sales are being used for control. In those portions of the Douglas-fir region with mixed stands of fir and pine the western pine beetle and mountain pine beetle continue to cause losses.

### Forest Diseases

The blowdown which fired off the Douglas-fir beetle epidemic focused attention on *Poria weirii* root rot as a factor in management planning. Being widespread throughout the region, *Poria weirii* causes more than four-fifths of the total damage by root rot to Douglas-fir. In addition to killing trees, it materially increases susceptibility to windthrow and provides breeding material for bark beetles. This fungus characteristically occurs in centers of infection, where it spreads from tree to tree through the roots. Since the *Poria weirii* fungus remains in the soil many years and will infect the next rotation of Douglas-fir growing on present centers of infection, it requires special consideration in future plans.

*Phytophthora lateralis*, a killing root rot of Port-Orford-cedar, has now been identified within the natural range of Port-Orford-cedar in Coos County, Oregon. This presents a real potential threat to Port-Orford-cedar stands and to the future successful management of this species. Another cause of damage in many stands is dwarf-mistletoe, which attacks ponderosa pine, western hemlock, and other conifers. Blister rust is an additional problem in management planning. In southern Oregon, blister rust is threatening extensive and valuable stands of sugar pine.

### Animal Damage

Although animal damage is a serious problem, especially in regeneration and immature stands, time is not available to give this subject the attention it deserves. Of the many animals causing damage, mice, rabbits, mountain beaver, porcupine, bear, beaver, deer, and elk may be cited as the primary offenders. As forestry becomes more intensive, animal damage is an increasingly important factor in growing timber crops. It is very apparent that overpopulations of animals on forest areas must be controlled to meet the primary objective of producing timber crops.

### What We Have Learned

From our experiences with forest pests in the Douglas-fir region we know that the following items are important in management planning:

1. Disruption of cutting budgets and sustained yield estimates by forest pests and windthrow emphasizes the need for flexibility in logging plans and periodic review of allowable cuts and development plans.

2. Mature and overmature stands must be carefully checked for losses, and areas most susceptible to loss should be given priority in logging plans. Old growth timber can no longer be considered as safely stored on the stump. At the same time immature stands are not immune to heavy damage.

3. Annual detection surveys should be an important part of the protection program on any forest area. Adequate surveys reveal windthrow areas and give early warning as to where timber is being killed or is likely to be killed by insects. This facilitates planning of sanitation-salvage logging to reduce both insect damage and deterioration losses.

4. There is a need for more ground checks on mortality losses and for more long-term trend plots or transects to provide a measure of the fluctuations in insect damage. At the same time we need more people on woods jobs looking for insect pests.

5. Means for undertaking prompt and adequate direct control measures must be maintained. Forest land managers should budget for insect and disease control just as they do now for fire control.

6. The critical salvage problem in the region emphasizes the importance of access roads as the key to minimizing timber losses. Rapid sanitation and salvage measures cannot be undertaken without an adequate road system.

7. Careful planning and training of woods personnel to give first priority to removal of beetle infested trees is essential in reducing insect epidemics as rapidly as possible. All too often logging is concentrated on salvage without sufficient attention to woods sanitation control measures.

8. Coordinated, objective, and aggressive research on the behavior and control of forest insects, diseases, and animals is essential to future successful forest management.

9. Forest managers must do more advance planning and prevention work on forest pest problems instead of regarding each new outbreak as a new crisis. Forest pests are one of the normal hazards in the business of growing timber crops.

10. Above all else, the work of the Northwest Pest Action Committee and its subcommittees has shown that through unified, cooperative action forestry organizations can meet forest pest problems threatening forestry as a business in the Douglas-fir region.

# Finding the Best Use for Each Tree[1]

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THE FOREST ECONOMY of New England has traditionally been an economy of plenty. Early settlers and subsequent wood-using industries were selective in their demands on the forest, each taking the trees best suited to his purpose and leaving the rest—presumably to grow but often to blow down, dry out, or deteriorate into worthless scrubs. As the lumberman was followed by the pulpwood operator, less exacting in requirements, the composition and quality of the residual stand after cutting was further deteriorated, quite aside from any consideration of the severity of the cutting. In short, the history of forest exploitation has consisted of cutting the best and leaving the worst trees in the woods. Obviously, a partial or complete reversal of this practice will be needed to restore forests to their former quality.

The second characteristic of forest exploitation until very recently was that usually only one product was harvested at a time, namely the one in demand by the operator at the moment. The sawmill man cut everything into saw logs, the pulpwood man everything into pulpwood, each limited only by the profit margin and sometimes in neglect of that, as when logs too small for profitable operation were cut and sawn. Commonly each one-product raid on the woods ignored the requirements of other wood consumers even when growing shortages resulted in higher unit prices for some products compared to others. It was very much like a farmer, intent on raising hogs, feeding all his sweet corn and garden vegetables to the hogs oblivious to the high prices he could obtain for these at his roadside stand.

[1]Presented at University of Maine 47th Annual Farm and Home Week, Orono, Maine, April 7, 1954.

## Rehabilitation the Problem

It is obvious to anyone who studies the forest conditions in New England with a discerning eye that it is not over-cutting, not clear-cutting, fires, or hurricanes that are the cause of lessened productivity, although all these may have an influence locally, but rather the deterioration brought about by failure to fully utilize the yield of the forest. It has been estimated that some seven million tons of woody material go to waste annually in the forests of New England, exclusive of that wasted in logging and milling.

Principles of crop production quite analogous to agriculture are indicated for remedying the understocked stands of degraded quality that are the rule. Namely, we need more good crop trees per acre and less weeds crowding them out and keeping them from growing. Fortunately, it is usually easy to get crop trees to seed in if there is space for them to grow, so that the problem of restoration of New England forests is predominantly one of close, complete, and diversified utilization.

## Mixed Forests Demand Mixed Utilization

Reasons why integrated logging is especially adapted to New England are many:

1. Roughness of terrain, brush, and distance from utilization plant rarely make tree-length logging practical. Therefore integration should occur at stump or preferably at the landing.

2. Forests consist of many species with many uses. New England forests have 40-50 species of trees, many of which are especially suited to one product, others have a variety of uses but some bring a better price than others. By contrast the Southern Pine Region and the West Coast have fewer species in mixture and are better suited to one product utilization.

3. There are many sizes and qualities in the average acre of forest in New England. Another way of expressing this is to say that many-aged mixed stands are most common. The first improvement cutting in such stands should remove some very large trees and some very small.

4. New England stands are usually low in volume per acre as a result of past treatment and one-product operations are liable to be submarginal. Every contractor, operator, and woodsman knows, without any time studies to prove it, that operating below a certain minimum volume per acre does not pay. This minimum volume is usually higher the less valuable the product being cut. It pays to roam wide areas of tropical jungle for one mahogany tree or drive a hundred miles to get one black walnut tree on a farmer's woodlot in Ohio but the northern woodsman wants "good cutting" when he goes after pulpwood. A low volume per acre in one product can be compensated by making possible the marketing of other products at the same time so that the total cut per acre is substantial.

5. One-product operations are traditionally wasteful. Witness the stave bolt hewers in the southern Appalachians or the high-grading of northern hardwoods for veneer logs. Integrated utilization permits a more economical operation by spreading the cost of improvements and overhead and permits harvesting a low volume of high value products with less waste.

6. Integrated logging makes possible the leaving of more good trees for future growth while still permitting a good economic cut and satisfactory return on the operation. How often do foresters excuse their over-cutting and high-

grading by the alleged necessity for "sweetening" the cut in order to tempt a buyer! The lower the volume and the poorer the quality the more prevalent this custom is.

7. These statements must not be interpreted as a blanket endorsement of partial cutting as contrasted to clearcutting and certainly not the so-called "selective cutting" which is a misnomer. While partial cutting should be the rule in young stands and often in many-aged timber of shade-tolerant species, there are also many cases where clearcutting, preferably in limited strips and patches, is the best method silviculturally. The reason for raising this discussion here is that integrated logging is good for clearcuttings too. Most so-called clearcuttings are merely high grading operations removing a high percent of the stand and are not clearcuttings at all. To be a really desirable silvicultural measure all trees should be removed in clearcutting, including the culls and young whip-like saplings. Integrated marketing makes possible cleaning up a cutting area so that reproduction may develop free from such obstacles.

### Development of Log Grades

An essential feature of integrated logging is the preliminary sorting of products in the woods. Usually the decision on use must be made at the time the tree is felled and bucked up. If all trees could be transported to the mill in full tree length, intelligent utilization would no longer be the responsibility of the woods crew. Where to divide a tree into logs and bolts involves a consideration of log grades. This is recognized by a recent publication of the U. S. Forest Products Laboratory as follows:

> A good system of log grades becomes even more important as integrated production of several products replaces conversion to a single product so that processing of raw material for different products can be geared to inherent qualities and values of the individual log.

Log grades are properly different quality grades of the same class of product and their recognition would introduce a further refinement to integrated logging. If all grades of the same product are destined for the same consuming market it is still important that the woodsman cut the logs so as to obtain the maximum of high grade material, just as the sawyer in a sawmill may "saw for grade." When, however, the value of the lowest grade log falls below the price of the next lower value product, that part of the tree should no longer be cut into low grade logs, but into another kind of product, for instance pulpwood.

Other factors such as necessity for meeting a minimum contract amount or filling a pulpwood car may justify deviation from a strict policy of each stick of wood for the highest use.

### Application of Integrated Logging

*On the farm woodlot.*—The farmer is probably in the best position to practice complete integration since he has complete control of his own operation when he does his own logging. He can select a tree for some special purpose on the farm; a few Christmas trees, some logs for sale, and some for custom sawing for his own use, and various kinds of pulpwood. He knows the prices he can get for various products, like birch spool wood and how it compares with what he can get for pulpwood. Perhaps he even has a truck and can deliver his products. He cuts some firewood, perhaps for sale to summer people, and he knows what grades he needs for that and how its value compares with other products. Such an operation has every advantage except bigness—which sometimes makes possible separation of more products and exploitation of distant markets.

*The small private woodlot.*—This differs from the farm woodlot in that the owner usually does not reside on the property and cannot undertake his own operating. Here it is a case of the owner taking the following steps:

1. Determine what kinds, sizes, and amounts of wood and timber are to be cut or offered for sale in a given year.

2. Obtain contracts to sell the various products or stumpage to one or more consuming industries and buyers, specifying delivery places, dates, and specifications.

3. Locate one or more dependable contractors who will undertake to produce the products and deliver them to the points specified in (2) at unit prices less than that in the sale contract. The difference in prices of these contracts less shrinkage in scale, etc., represent stumpage obtained. While it has never been done to the writer's knowledge, there is good justification for selling some low grade products at an actual loss if by so doing the operation as a whole is made possible and is profitable. Such a case might occur where it is necessary to develop a large volume per acre to make the job attractive.

If firm sales contracts are concluded in advance and nothing cut not covered by contract, chances of confusion and loss are minimized. However, considerable effort is needed at the start to check quality and specifications and cooperation of buyer and seller as needed to keep an operation moving.

*The wood-using industry.*—Theoretically it should be possible to separate more different products on a large scale operation than on a small one. A small job may produce but one veneer quality log and distance to market and other factors would not make it worth while to select less than an even truckload or carload of one product. On large company operations more of these scattered products may accumulate. Furthermore a company with many contacts and overhead staff should be in a good position to utilize material to the best advantage. Pressure to supply the requirements of their own mills causes many companies to forego such opportunities. Furthermore since the profits arise chiefly from the manufacturing, there is actually less incentive to engage in integrated logging with its attendant complexities of supervision and administration. The best opportunity

for integration is at the plant, and this is common practice where sawmill, pulp mill, and other utilization plants are under the same management. Notable examples of this occur on the West Coast and in Sweden and a beginning has been made in New England.

*Forest owner cooperatives.*—The most successful cooperatives have made full use of integrated marketing. Good examples are Otsego Forest Products in Cooperstown, New York and Connwood, Inc., in Connecticut. There are many difficulties in integrated logging in these organizations but none of them really differ from problems of a one-product operation. These arise more from the number of different small jobs that must be coordinated. An advantage of cooperative marketing should be that with a "milk route" system of log and wood pick-up, small quantities of each product can be collected by the cooperative at the roadside and delivered to various markets. The overhead costs of administering such schemes have often offset the benefits to the owner, but the plan needs further trial.

*Efficient woods crew important.*—Where the owner cannot do or supervise constantly his own operation, the key to success of integrated logging is a trained production crew that takes a real interest in "getting the most out of the timber." A trained dependable crew of two or three men and a horse is preferable to untrained and unskilled men working under the supervision of a non-working foreman.

If no experienced or skilled woods labor is available, then, of course, close supervision will be necessary. It has been our practice to pay different piece work prices for different assortments and occasionally grades, paying more for the higher value ones than the cheaper cuts. The purpose is (1) to pass on some of the profit to the worker and (2) to make an incentive to separate out the higher value material. If not separated, payment is made on the basis of the lower value product in the pile or skidway.

*Separation of products.*—There are generally three opportunities for separating products in integrated logging:

1. At the stump. If wood must be stump piled and hauled out on snow months later, we require choppers to pile different kinds of 4-foot wood separately, sometimes in separte tiers between the same stakes, squared up so each can be scaled. The separation is not always perfect but can be corrected at the next stage.

2. At the landing. Whether separated at the stump or not, the teamster is required to pile different kinds of 4-foot wood separately at the landing and skid different kinds of long timber separately.

3. Trucking. The final chance to separate is when the material is loaded on trucks, either mechanically or by hand. Pieces that do not belong are then tossed out and eventually find their way to the place where they belong. Thus if some small wood finds its way into pulpwood either at the stump or landing, it is discarded by truckmen hauling pulpwood, and placed in the cordwood or charcoal wood pile. Conversely, a truckman loading charcoal wood to take to the kilns takes out any pulpwood or fireplace wood sticks that he runs across and throws them on the proper pile.

*Examples of integrated logging on the Fox State Forest.*—Circumstances forced adoption of integrated logging and marketing on the Fox State Forest at Hillsboro, N. H. Composed of stands that had grown up on abandoned pasture lands, the forest was typical of the understocked poor quality stands of central New England. Fifteen years of stand improvement and cultural work was largely wiped out by the 1938 hurricane that destroyed 75 percent of the saw timber. This made it more essential than ever to husband saw-timber growing stock and retain every tree that had any future prospect of producing quality timber.

Since the hurricane, it has been impossible to sell any cordwood, pulpwood or saw timber on the stump, but there is a ready market for all these products at roadside or loaded on cars. The result has been the employment of contract choppers and teamsters, some of whom chop the year round. We usually have a different work price for each different product. The following are some of the products marketed from the forest, 1933-1954:

LOGS
- Saw logs—various species
- Tie logs—hardwood
- Veneer logs—hardwood
- Log length rough hardwood pulpwood

POLES
- Peeled pine, hemlock, and spruce cabin poles
- Red pine, spruce, and oak piling

POSTS
- Peeled oak highway guard rail posts
- Rough red pine fence posts
- Peeled, treated red pine fence posts
- Rough, treated and untreated hophornbeam posts and stakes

VENEER BOLTS (4—4½ feet)
- Birch, beech, maple, and oak

TURNERY BOLTS (4—4½ feet)
- Birch

EXCELSIOR WOOD (4—4½ feet)
- Peeled aspen, basswood, willow, and white pine.

POWDER WOOD (4 feet)
- Peeled willow, alder, and red maple

PULPWOOD
- Peeled aspen
- " birch, beech, and maple
- " elm, oak
- " pine
- " spruce and fir
- " hemlock
- Rough birch, beech, and maple
- " elm and oak
- " pine
- " hemlock and tamarack
- " spruce and fir

HANDLE STOCK
- Ash
- Hophornbeam (peavey handles)

CORDWOOD
- Grade I cleft hardwood (fireplace)
- " II round hardwood (smelter or charcoal wood)
- " III softwood and hardwood (charcoal wood)

CHRISTMAS TREES

CHRISTMAS GREENS (boughs)

HEMLOCK BARK (tanbark)

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# Weeding—an Effective Treatment for Stimulating Growth of Northern Hardwoods[1]

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*To produce valuable tree crops from young northern hardwood stands, the fast-growing weed species must be controlled. Weeding was found to be effective in Allegheny Plateau forests for growing crop trees of black cherry, sugar maple, and other desirable species.*

IN THE northern hardwood forests of the Allegheny Plateau, close utilization is common practice. Heavy local demands for raw material have brought about harvesting techniques that are dominated by clearcutting. This kind of cutting is used not only in old-growth timber, but also in second- and third-growth stands.

Areas subjected to such drastic treatment usually revert to dense sprout growth, which matures into low-value timber. Where sprouts are scarce, the area is quickly invaded by pioneer species such as pin cherry and aspen.

Under certain conditions, highly desirable black cherry seedlings become established in sufficient quantities. Black cherry seedlings and sprouts grow rapidly and are seldom dominated by undesirable pioneer species. Sugar maple, however, is soon crowded, overtopped, and retarded by the faster-growing weed species.

To produce a valuable crop in these young stands, it is generally considered necessary to modify and direct competition. Eyre and Zillgitt (*3*) recommend weeding as one stand-improvement measure for enhancing the quality and composition of young hardwood stands. Arbogast (*1*) agrees that weeding operations are desirable if the composition of mixed stands is to be improved. According to Cline (*2*), weeding has a greater effect on the make-up of a stand that any other silvicultural operation.

Weedings in hardwood stands should be made on a crop-tree basis. Jensen (*5*) recommends this method for northern hardwoods because it assures an adequate stocking of desirable trees and permits the remaining stems to serve as trainers. Crop-tree weedings are also recommended for young hardwood stands in the Southern Appalachians (*4*).

## A Study of Weeding

In 1936 a weeding experiment was begun on the Kane Experimental Forest in northwestern Pennsylvania to evaluate practical methods of weeding northern hardwood stands. This study was designed to determine the relative growth rates of crop trees given different degrees of release. These growth rates were to be compared with the increment of similar crop trees in undisturbed stands.

This experiment was made in second- and third-growth hardwood stands ranging from 13 to 18 years old. Six pairs of square 1/10-acre plots were laid out in each of 4 randomized blocks. One plot of each paid was left untreated. Within each block, 2 plots were randomly selected for light weeding, 2 for silvicultural weeding, and 2 for heavy weeding. Each plot was surrounded by a ½-chain isolation strip.

The crop trees were remeasured individually in 1941, and all other trees were tallied by 1-inch diameter classes. Preliminary results for the first 5 years since treatment were reported by Ostrom and Hough (*6*). In 1946 the crop trees were remeasured again. This time tallies of trainers and weed trees were omitted. The next measurement was made in 1952, when a sample of half the plots was chosen at random; both crop trees and other elements of the stand were included in this remeasurement.

## Selection of Crop Trees

Crop trees were selected on the basis of species, origin, form, freedom from defect, and spacing. The order of species preference, beginning with the most desirable, was as follows: sugar maple, black cherry, hemlock, beech, yellow-poplar, cucumbertree, yellow birch sweet birch, and red maple.

In selecting crop trees, stems originating from seedlings or seedling sprouts were favored over stump sprouts. Wherever possible, straight, unforked specimens were chosen as crop trees. Cankered or scarred trees were rejected.

The objective for crop-tree spacing ranged from 12 feet in 13-year-old stands to 15 feet in 18-year-old stands. Crown class was recorded, but it was not considered a governing factor in making the crop-tree selections.

## Intensity of Weeding

Three intensities of weeding were used to release crop trees. On the lightly weeded plots, the only trees removed were those that were overtopping selected crop trees. On the heavily weeded plots, all trees were removed that we competing with the crop trees from above and from the sides.

The silvicultural weeding was based on individual species' requirements for best future growth and development. This treatment was very flexible. Only a few weed trees were removed from the competing circle of vegetation around dominant black cherry crop trees, because this species needs to be crowded to attain its straight, limb-free character. However, the silvicultural weeding treatment was just the opposite for small sugar maple crop trees, because this relatively slow-growing species requires heavy release for its best juvenile growth and development.

[1]This article constitutes a further progress report on a continuing study. It was initiated and carried out by A. F. Hough, whose assistance herein is gratefully acknowledged by the author. Further reports of results, comparing weeding with early stand-improvement thinnings and untreated stands, will widen the scope of the study.

FIG. 1.—Results of heavy weeding in a young northern hardwood stand. *A*, before weeding. *B*, immediately after heavy weeding. *C*, the same stand 16 years later. *Photo, U. S. Forest Service.*

All cutting was done with axes and pruning shears. The shears were inefficient for removing closely spaced stems of sprout clumps. Weed trees had been marked in advance but only those on the treated plots were cut. An analysis of time records for the weeding operation showed no significant difference due to intensity of treatment. The average weeding time was 17½ man-hours per acre.

### Analysis of Data

The 1952 data were first evaluated by using the analysis-of-covariance technique. All crop trees on the unweeded plots were considered in one analysis, those on the weeded plots in another.

The analysis was based on the initial diameter and the 16-year diameter growth of each tree. Data were kept separately by species and crown classes. There were three species groups: black cherry, sugar maple, and other.[2] There were also three crown-class groups: dominant, codominant, and intermediate. The intermediate class included trees in the overtopped crown class.

[2]This group comprises only 12 percent of all crop trees. Red maple predominates in this group, followed by hemlock, yellow birch, sweet birch, beech, and cucumber magnolia.

Regressions were developed for each of the nine species-crown class combinations by first using crop trees on the unweeded plots. The form of the general regression equation was

$$G' = Gsc + b(X\text{-}Xsc)$$

in which $Gsc$ represents the mean 16-year diameter growth of crop trees for each species-crown class combination and $Xsc$ represents the mean beginning diameter of crop trees within each species-crown class group.

Except for the regression coefficient, $b$, the remaining values in the equation pertain to crop trees on the weeded plots. The beginning diameter for each weeded tree, $X$, was substituted in the proper equation to obtain $G'$. This value ($G'$) is an estimate of what the 16-year diameter growth of weeded trees would have been if they had not been weeded. Both the actual diameter growth ($G$) and the estimated growth ($G'$) were obtained for each released crop tree. The difference between these two values ($G$-$G'$) represents the increased diameter growth due to weeding treatment.

Mean growth differences were computed for each weeding treatment in each block. An analysis of variance was made of these values. The effectiveness of the three weeding intensities was evaluated for each species-crown class group by testing the appropriate means against zero.

### Results

The analyses showed that there were significant mean growth differences due to intensity of weeding. For the weeded crop trees, the heavy treatment resulted in the best diameter growth and the light treatment in the poorest. Over a 16-year period, the mean diameter growth differences (weeded-unweeded) were as follows:

| Intensity of treatment | Mean diameter growth differences (*inches*) |
|---|---|
| Light | 0.46 |
| Silvicultural | 1.07 |
| Heavy | 1.38 |

A test of the differences between these means showed that increased diameter growth resulting from both the heavy and silvicultural weeding treatments was significantly better than that obtained from the light treatment. These results are in line with the preliminary findings of Ostrom and Hough (*6*).

Additional tests indicated that there was no significant difference in diameter growth between the

TABLE 1.—EFFECTS OF WEEDING TREATMENTS ON DIAMETER GROWTH, IN INCHES

| Item | Black cherry | | | Sugar maple | | | Other[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Dominant | Codominant | Intermediate[2] | Dominant | Codominant | Intermediate[2] | Dominant | Codominant | Intermediate[2] |
| **UNWEEDED TREES[3]** | | | | | | | | | |
| Average initial diameter | 2.74 | 2.18 | 1.29 | 2.07 | 1.57 | 1.01 | 4.50 | 2.88 | 1.53 |
| Average diameter growth during 16-year period | 4.58 | 3.20 | 1.56 | 1.93 | 1.49 | .96 | 4.77 | 2.22 | 1.82 |
| **WEEDED TREES** | | | | | | | | | |
| Average diameter increase over unweeded trees during 16-year period:[4] | | | | | | | | | |
| Light weeding | 0.14 | 0.00 | 0.94 | 0.28 | 0.39 | 0.35 | ---- | ---- | 1.53 |
| Silvicultural weeding | 1.42 | 1.34 | .54 | .87 | 1.35 | 1.09 | —0.40 | 1.97 | .38 |
| Heavy weeding | 1.46 | 1.32 | 1.86 | 1.55 | 1.31 | 1.19 | ---- | 2.25 | ---- |
| Average diameter growth during 16-year period: | | | | | | | | | |
| Light weeding | 4.72 | 3.20 | 2.50 | 2.21 | 1.88 | 1.31 | ---- | ---- | 3.35 |
| Silvicultural weeding | 6.00 | 4.54 | 2.10 | 2.80 | 2.84 | 2.05 | 4.37 | 4.19 | 2.20 |
| Heavy weeding | 6.04 | 4.52 | 3.42 | 3.48 | 2.80 | 2.15 | ---- | 4.47 | ---- |

[1]This group comprises only 12 percent of all crop trees. It includes red maple, hemlock, yellow birch, sweet birch, beech, and cucumbertree.
[2]Includes trees in both the intermediate and overtopped crown classes.
[3]Values taken directly from field data.
[4]Values obtained from regression equation.

lightly weeded and unweeded trees. However, crop trees receiving both heavy and silvicultural weeding treatments made significantly better growth than unweeded trees. Changing stand conditions on one of the heavily weeded plots are shown in Figure 1.

In addition to weeding intensity, species and crown class also affected crop-tree diameter growth. The effects of these two variables were as follows:

1. For cherry, the increase in 16-year diameter growth of the weeded over the unweeded trees was significant for all except the lightly weeded dominant and codominant trees.

2. For maple, the three weeding treatments gave significant diameter growth increases for all except the lightly weeded dominants.

3. For other species, there were insufficient data for complete analysis. However, of the five species-crown class combinations tested, only the lightly weeded intermediates and silviculturally weeded codominants made significantly better diameter growth than unweeded trees.

Complete results by weeding intensity, species, and crown class are presented in Table 1. It is evident that the average 16-year diameter growth of unweeded trees was best in the dominant crown class and poorest in the intermediate-overtopped crown class. Weeding did not change this relationship. However, more than 90 percent of the crop trees released by weeding made better diameter growth than unweeded crop trees.

## Conclusions and Recommendations

In young northern hardwood stands, weeding increased the diameter growth of crop trees. Crop trees released by either heavy or silvicultural weeding treatments made significantly better growth than either lightly weeded or unweeded trees.

In general, dominant and codominant trees made the best diameter growth when given heavy or silvicultural release. However, the percentage increase in diameter growth of weeded over unweeded trees was generally greater in the intermediate-overtopped crown class.

As a result of this study, the following recommendations can be given for weeding treatments in similar stands:

1. Select crop trees of desirable species and form which have originated from seedlings or seedling sprouts. Spacing should range between 12 and 15 feet in 12- to 18-year-old stands. Preferably choose trees in the dominant and codominant crown classes.

2. Apply the silvicultural grade of weeding to dominant and codominant black cherry crop trees. Intermediate and overtopped trees of this species should be released by heavy weeding treatments.

3. Regardless of crown class, sugar maple crop trees should be released by applying the heavy weeding treatment.

4. Crop trees of other associated species can be effectively released by applying the heavy or silvicultural weeding treatments.

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# The Rate of Natural Falling of Beetle-Killed Ponderosa Pine Snags

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DEAD TREES, or snags, standing in a forest are of considerable importance to timber managers. They increase fire hazards so much that every year large sums are spent to fall snags along roads and on timber sales. But snags also serve timber cruisers as a measure of past timber mortality and as an index to the susceptibility of the stand to damage by bark beetles. Naturally, then, how fast snags fall is of considerable interest to foresters and loggers. This paper summarizes three decades of records on beetle-killed ponderosa pine (*Pinus ponderosa*) snags.

Snags are produced by several agencies—fire, insects, tree diseases, lightning, flooding, or drought. In the ponderosa pine forests of the West, by far the greater number are produced by bark beetle infestations. Control of bark beetles would be the biggest single step that could be taken to alleviate the snag problem.

## Source of Data

For more than 30 years damage by beetles has been surveyed annually on check plots in the interior ponderosa pine type of southern Oregon and northeastern California. These fine commercial stands of ponderosa pine contained volumes ranging from 6,000 to 20,000 board feet per acre, but from 1917 to 1937 the western pine beetle often destroyed as much as 20 to 50 percent of the stand. The average gross loss for the two decades was about 35 percent. This unrelenting annual attack by beetles produced a vast number of snags. On stands averaging Site 4 and with residual volumes of 15,700 board feet per acre, snag counts in 1932 showed a range of 1.1 to 7.9 snags per acre—an average of 4.0.

A valuable by-product of these surveys has been the data obtained on the natural rate at which beetle-killed ponderosa pines fall under virgin stand conditions. A short article on this natural reduction of hazard during the first 9 years after death was published in 1929.[2] That article was based on a snag census made in September 1928, on one check section of 640 acres, the Crowder Flat section on the Modoc National Forest, California, which had had each year's beetle-killed trees marked since 1919.

Between 1929 and 1949 much additional information was obtained from snag count recruises of this and other check sections with long-time records. In 1932, three of the full-section, 640-acre check plots on which continuous records had been kept since 1921 were recruised and the standing snags rechecked. In 1935, four more check plots were recruised, and in August 1949 the Crowder Flat check plot was again recruised to determine how many of the very old snags were still standing.

On most of these recruises a 4-man survey crew was used—a compassman and three spotters. Strips, 5 chains in width, traversed each 40 acres four times, the spotters examining and recording all snags encountered. It was felt that this thorough coverage missed very few snags. All of these sections had been cruised annually since 1921, and the trees killed during each year were blazed and given a serial number. Therefore, it was possible to tally the number of snags of each year's loss still standing on the date of the recruise. The only difficulty was in deciphering illegible numbers on some of the older snags, where the wood had decayed or the number faded. Where the number of unidentifiable snags was not great, they were distributed by years in proportion to the number not found for that year's kill. Where the number was large, as in the 1949 recruise of the Crowder Flat section, no attempt at distribution was made and only the average percent of old snags found was recorded.

## Rate of Fall

The rate of snag fall was very slow for the first 5 years after death of the tree (Table 1). Then, between the 5th and 15th years, the drop-out of snags was very rapid. After the 15th year, the rate of fall decreased markedly and then gradually tapered off for the larger and better preserved snags (Fig. 1). After 25 years, 10 percent of the original snags were still standing, and a few of these may remain for another 15 years or more.

## Factors Influencing Rate of Fall

Obviously, the rate at which snags fall is primarily dependent upon the time elapsed since death, which in turn is dependent upon the rate at which root rots and wood borers progress. But the rate also depends upon the size or diameter of the snags, the proportion of heartwood, and many other variables. Chief among these are environmental conditions such as climate, forest type, timber species, site, soil mosture, and the prevalence of windstorms. The prevalence of heavy windstorms is unpredictable, and the present study did not sample a wide range of climates, forest species, sites and types, or soil and moisture conditions. This snag study was limited to the pure ponderosa pine type of southern Oregon and northern California east of the Sierra-Cascade ranges. Its applicability to the general ponderosa pine type under other climatic conditions is conjectural, at best.

## Effect of Tree Diameter or Size

Various studies have shown that fungi and insects destroy the sapwood of pine much more rapidly than the heartwood; so, we would expect to find trees of large diameter and a thick core of heartwood standing longer than smaller, younger trees. In general, this held true, but the difference in rate of

[1] Maintained at Berkeley, California, by the Forest Service, U. S. Department of Agriculture, in cooperation with the University of California.

[2] Keen, F. P. How soon do yellow pine snags fall? Jour. Forestry 27: 735-737. 1929.

Table 1.—Percent of Snags Still Standing, by Years Since Death
(Average rates)

| Plots | Years since death | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 17 to 30 |
| On loam soils | | | | | | | | | | | | | | | | |
| Crowder Flat: | | | | | | | | | | | | | | | | |
| 1928 Record | 100 | 95 | 93 | 93 | 86 | 72 | 51 | 32 | 28 | ... | ... | ... | ... | ... | ... | ... |
| 1932 Record | 100 | 99 | 99 | 92 | 77 | 64 | 46 | 46 | 47 | 25 | 19 | 11 | 6 | ... | ... | ... |
| 1949 Record | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10 |
| Owens: | | | | | | | | | | | | | | | | |
| 1935 Record | 97 | 97 | 89 | 95 | 81 | 72 | 42 | 47 | 40 | 37 | 44 | 34 | 12 | 10 | 12 | ... |
| Clover Station: | | | | | | | | | | | | | | | | |
| 1932 Record | 96 | 94 | 90 | 76 | 62 | 50 | 39 | 32 | 32 | 17 | 16 | ... | ... | ... | ... | ... |
| Average for loam soils | 99 | 95 | 91 | 88 | 76 | 64 | 45 | 37 | 36 | 30 | 20 | 19 | 8 | 10 | 12 | 10 |
| On pumice soils | | | | | | | | | | | | | | | | |
| Sycan: | | | | | | | | | | | | | | | | |
| 1932 Record | 100 | 99 | 96 | 92 | 96 | 84 | 76 | 71 | 44 | 40 | 38 | ... | ... | ... | ... | ... |
| 1935 Record | 100 | 96 | 95 | 88 | 84 | 79 | 69 | 64 | 53 | 47 | 43 | 39 | 33 | 33 | ... | ... |
| Merritt: | | | | | | | | | | | | | | | | |
| 1935 Record | 100 | 100 | 96 | 87 | 84 | 59 | 57 | 52 | 54 | 40 | 50 | 33 | 32 | 35 | ... | ... |
| Average for pumice soils | 100 | 99 | 95 | 90 | 93 | 82 | 71 | 63 | 53 | 45 | 43 | 36 | 33 | 33 | ... | ... |
| Fire snags on pumice soils: | | | | | | | | | | | | | | | | |
| Pringle Falls[1] | 98 | 95 | 88 | 84 | 77 | 70 | 65 | 60 | 53 | 49 | 44 | 40 | 37 | 35 | ... | 22 |

[1]Dahms, Walter G. Research Note No. 57, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. 1949.

fall by diameter classes was not as marked as one might expect.

The difference in rate of falling between trees of small and large diameter is indicated by the diameter distribution of snags on three of these plots—i.e., the Clover Station, Sycan, and Crowder Flat sections—when recruised after 7 years, or roughly at the time when half of the snags had fallen. By 10-inch diameter classes, the average per cent of snags on these three sections was:

| D.b.h. (*inches*) | Standing snags (*percent*) | Fallen snags (*percent*) |
|---|---|---|
| 10-18 | 25 | 75 |
| 20-28 | 35 | 65 |
| 30-38 | 50 | 50 |
| 40-48 | 65 | 35 |
| 50 and over | 70 | 30 |

The recruise of 1949 gave a longer period of records for the Crowder Flat section. A chart of these data (Fig. 2) shows the progressive and higher proportional loss in the smaller diameter classes, and the longer life of the larger snags.

On the average, only 10 percent of the snags produced during the period 1919 to 1932 were still standing in 1949 (Table 2), but 28 percent of those 40 to 48 inches in diameter were still standing. The lower percentage of snags left standing in the 50-inch and over class is probably due to accidents occurring among the small number of snags represented in this class.

Since tree size has an appreciable effect on rate of fall, one might suspect that the variation in percent of snags still standing on the different plots after 5 years (Table 1) might be due in large part to a difference in snag size. Actually, the distribution of snags by size classes was essentially the same on all plots (Table 3). The Clover Station plot had the highest proportion of snags larger than 40 inches, and the Sycan section had the lowest, but the differences were so slight as to be of little significance.

### Soil Conditions

The Sycan and Merritt Creek plots were on loose volcanic pumice which dries out rapidly at the ground line. The Crowder Flat and Clover Station plots were on red, volcanic loam of the Aiken series. The Owens section was on grey clay loam of the Underwood series. The Aiken and Underwood

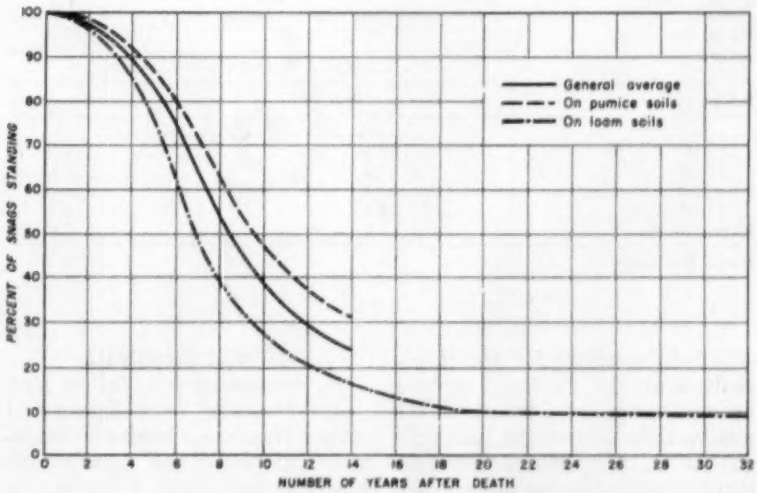


Fig. 1.—Percent of beetle-killed trees remaining standing as snags.

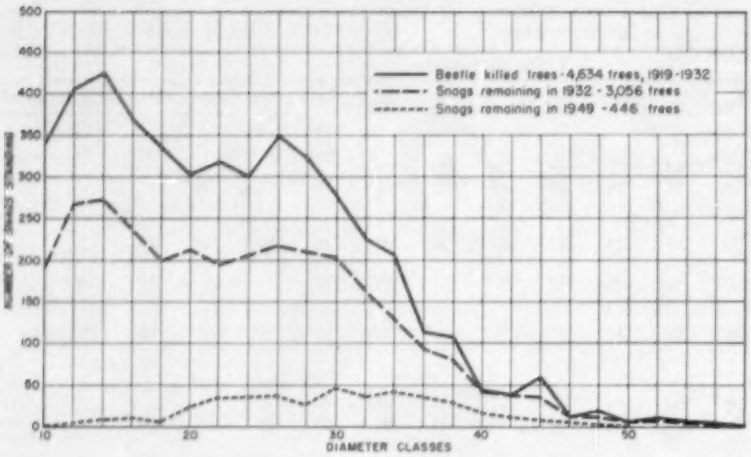
Beetle killed trees - 4,634 trees, 1919-1932
Snags remaining in 1932 - 3,056 trees
Snags remaining in 1949 - 446 trees
DIAMETER CLASSES

FIG. 2.—Diameter distribution of snags, at three periods since death.

TABLE 2.—SNAG CENSUS ON CROWDER FLAT SECTION BY DIAMETER CLASSES

| D.b.h., inches | No. of original snags | Percent of original snags standing After 0-14 years (1932 cruise) | Percent of original snags standing After 17-30 years (1949 cruise) |
|---|---|---|---|
| 10-18 | 1,886 | 62 | 21 |
| 20-28 | 1,599 | 65 | 10 |
| 30-38 | 931 | 72 | 21 |
| 40-48 | 179 | 82 | 28 |
| 50 and over | 39 | 72 | 12 |
| Total | 4,634 | 66 | 10 |

TABLE 3.—DISTRIBUTION BY DIAMETER CLASS OF TREES KILLED 5 OR MORE YEARS BEFORE DATE OF RECRUISING

| D.b.h., inches | Killed 1921-26, recruised 1932 | | |
|---|---|---|---|
| | Crowder Flat | Clover Station | Sycan Section |
| | *Percent* | | |
| 10-18 | 36.8 | 28.4 | 33.6 |
| 20-28 | 35.8 | 43.2 | 43.3 |
| 30-38 | 22.9 | 22.3 | 19.8 |
| 40-48 | 4.0 | 5.4 | 3.0 |
| 50 and more | 0.5 | 0.7 | 0.3 |
| Basis, No. snags | 1,364 | 990 | 2,315 |

| D.b.h., inches | Killed 1921-29, recruised 1935 | |
|---|---|---|
| | Owens section | Merritt section |
| | *Percent* | |
| 10-18 | 32.3 | 33.5 |
| 20-28 | 41.8 | 40.6 |
| 30-38 | 20.8 | 20.5 |
| 40-48 | 4.5 | 4.4 |
| 50 and more | 0.6 | 1.0 |
| Basis, No. snags | 934 | 1,054 |

soils hold moisture for longer periods near the surface. On the average, snags stood longer on the pumice soils than on the loam soils (Table 1). The difference is particularly noticeable for snags standing more than 10 years.

## Cause of Tree Death

Foresters sometimes believe that snags resulting from fires stand longer than those arising from insect kill, reasoning that insects carry in wood rots, whereas fire-killed snags are often "case-hardened" and sterilized. Dahms has reported[3] the rate of fall for fire-killed snags on pumice soils at Pringle Falls Experimental Forest: About 50 percent were standing at the end of 10 years, and 25 percent at the end of 18 years. This rate is similar to that for beetle-killed snags on the pumice soils of the Sycan and Merrit sections. Although the cause of death may have an influence on rate of fall, it would appear that soil conditions are more important.

## Standing Snags as an Indicator of Past Loss

Timber cruisers often seek to estimate past loss by a count of snags; but snags drop out at a variable rate and cannot be definitely identified as to year of death. Consequently, any reconstruction of recent mortality is uncertain. In the hope of improving the estimates, a test of snag classification was started in 1935. Four snag categories were defined.

1. "Red tops"—Recently killed trees with red needles remaining so as to give them a red color. This group was defined more precisely in two subdivisions:
   a. With 10 percent or more red foliage remaining;
   b. With only a few red or brown needles remaining.
2. "Black tops"—Dead trees with all needles fallen, small limbs and twigs remaining intact, bark tight, top appearing black.
3. "Yellow tops"—Dead trees with all needles fallen, bark slipping so as to expose the yellow sapwood. This group was further subdivided to include:
   a. Bark 1 to 25 percent fallen;
   b. Bark slipping, to 75 percent gone.
4. "White tops"—Old snags with more than 75 percent of bark fallen, wood weathered to gray-white; often called "buckskins."

(All snags counted had to be 10 inches d.b.h. or over and, if broken off, the stub had to be at least 20 feet high.)

[3]Dahms, Walter G. Research Note No. 57, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. 1949.

Three of the check sections were intensively cruised and each previously dated snag placed in one of these categories. It was found that the actual ages of the snags could not be determined by this classification. "Red tops" with 10 percent or more of the foliage retained (subdivision a.) were from 1 to 5 years old. If they had a few red or brown needles retained (subdivision b.), the age was from 1 to 6 years. "Black tops" were anywhere from 1 to 13 years old, and "yellow tops" from 2 to 15 or more years. "White tops" were at least 5 years old, but might be any number of years older.

This classification, however, did prove useful as a measure of cumulative past loss. A count of all red tops retaining 10 percent or more of their foliage was found to be equal to 1.7 years of loss (Table 4), even though the age of snags varied from 1 to 5 years. A count of all black tops and red tops represented 7.5 years of loss. If yellow tops were added, the total equalled 9.2 years of loss. If all snags were counted, the total was equal to 11.4 years of loss.

In 1937 this study was extended by a 10 percent stand cruise and snag count on 16 additional 640-acre check sections in Jackson, Klamath, and Lake Counties of southern Oregon. Comparing the number of snags counted with the known number of trees killed on these plots in the previous 17 years, the years of loss represented by the different snag categories were as follows:

| Snag class counted | Number of years of loss |
|---|---|
| Red tops, with 10% or more of foliage retained | 1.9 |
| Black tops plus red tops | 6.5 |
| Yellow tops plus black tops and red tops | 8.0 |
| White tops plus above classes | 9.2 |

A comparison of the above averages with those shown in Table 4 indicates that the number of snags counted will vary with the intensity of the cruise, and probably with the effort of cruisers to do a good job of snag counting.

On the basis of all data obtained in the different snag cruises, it is believed that, if a reasonably careful cruise of 10 percent or more of snags is made, an estimate of past bark-beetle loss can be obtained by counting the four categories of snags as shown in Table 5.

As a rule-of-thumb, cruisers may assume that a full count of standing snags is equal to about 10 years of loss. Based on the evidence obtained from these snag studies, this rule has been used in cruising timber of the interior ponderosa-pine type of eastern Oregon and northeastern California for several years.

## Summary

The rate of natural fall of beetle-killed ponderosa pines in the interior ponderosa pine type of southeastern Oregon and northeastern California is primarily dependent upon time elapsed since death, but this rate is modified by tree size, soil conditions, and several unpredictable variables. Rate of fall in this study was slow for the first 5 years, with 85 percent of snags still standing at the end of that time. Then, as the effects of wood rots and wood borers accumulated, snags fell at an increasingly rapid rate between the fifth and fifteenth years. Small trees with much sapwood fell faster than the average. After the fifteenth year, the rate of fall decreased, and the larger, more resistant trees stood for a long time. After 25 years, 10 percent of the snags were still standing, including 25 percent or more of those in the 40-inch and larger diameter classes. It seems likely that some of the larger snags might stand for 50 years, if not felled by man.

Snag disposal might well concentrate on falling that 25 percent of the snags which are 30 inches or more in diameter, which stand longest, and let nature fall those of smaller diameter.

In cruising snags to determine the amount of recent loss, a count of red tops equalled 1.8 years of loss; black tops and red tops together, 6.7 years; yellow, black, and red tops, 8.3 years; and all snags, including white tops but excluding snags less than 10 inches d.b.h., stubs less than 20 feet high, and old, fire-blackened snags and stubs, equalled 9.6 years of bark-beetle loss. The rule-of-thumb that counting all snags would give an approximation of the past 10 years of loss has been found useful in timber cruising in the ponderosa pine type of eastern Oregon and northeastern California.

Table 4.—Years of Loss Represented by Cumulative Snag Total at Three Plots, by Class of Snag[1]

| Snag class | Number of years of loss at— Merritt | Sycan | Owens | Average |
|---|---|---|---|---|
| Red tops: | | | | |
| (a) With 10% or more foliage retained | 1.9 | 1.1 | 2.2 | 1.7 |
| (b) With a few red needles or more | 2.3 | 2.3 | 2.3 | 2.3 |
| Black tops plus red tops | 8.1 | 8.0 | 6.5 | 7.5 |
| Yellow tops plus black and red tops: | | | | |
| (a) Bark 1 to 25% gone | 9.0 | 8.6 | 8.7 | 8.7 |
| (b) Bark 25 to 75% gone | 101 | 8.7 | 8.8 | 9.2 |
| White tops plus above classes (Equals all snags) | 14.0 | 9.0 | 11.1 | 11.4 |

[1]From 100 percent snag cruises in 1935.

Table 5.—Years of Loss as Estimated from 10 Percent Cruise

| Snags to be counted | Years of loss | Std. dev. |
|---|---|---|
| All red tops, including those with 10% or more of foliage retained | 1.8 | 0.7 |
| Black tops plus above red tops | 6.7 | 1.5 |
| Yellow tops, with up to 75% of bark gone, plus above classes | 8.3 | 1.7 |
| All snags, including white tops[1] | 9.6 | 2.2 |

[1]Excluding trees less than 10 inches d.b.h., stubs less than 20 feet high, and old fire-blackened snags and stubs.

# Foliage Treatments Improve Survival of Longleaf Pine Plantings

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*Tests of needle clipping or wax foliage coating, two methods of reducing transpiration in pine seedlings, show that field survival of planted longleaf can be increased.*

THE FREQUENTLY POOR first-year survival of longleaf pine is one of the serious obstacles to successful planting of this valuable tree. Apparently much of the early mortality in this species is due to the drying out of seedlings from continued transpiration before the disturbed root systems can make up the water loss. This article summarizes tests conducted to determine whether needle clipping and wax foliage coatings will improve the early survival of planted longleaf pine seedlings. Past research has provided some support for these theories (*1, 2, 3, 5*).

## Methods

The tests were carried out on a wide variety of sites from Florida to Louisiana in 1951 and 1952.

Four treatments were tested: untreated check, clipping, dipping, and clipping and dipping combined. In the clipping treatments the needles were trimmed to five inches (Fig. 1) immediately after the seedlings had been lifted from the nursery beds. The seedlings were dipped by immersing their tops to root-collar depth in a 1:3 emulsion (by weight) of Dowax.[1] Care was exercised to prevent the wax from getting on the roots. In 1951 the seedlings were dipped soon after lifting, and in 1952 they were dipped in the field, just before planting. All seedlings were bar-planted.

The seedlings used in 1951 were from the W. W. Ashe Nursery, where they had been heavily fertilized to get a lush growth of foliage for a rigorous test. Planting was in February on the Ocala National Forest in central Florida, the Apalachicola in west Florida, the Conecuh in south Alabama, and the Kisatchie in central Louisiana. All planting sites were dry. The planting on each forest was of a randomized complete block design with eight replications and 50 seedlings per plot.

This test was repeated in 1952. The seedlings this year were also from the Ashe Nursery, but had received no special fertilizer treatment and were probably better balanced than those used in 1951. Plantings were made in February on the four national forests named above and also on the DeSoto in south Mississippi. The field design was similar except that the plot size was reduced to 25 seedlings.

Supplementary installations were made to test time of clipping, length of clipping, effect of the foliage treatments on stored seedlings, and effect of the wax foliage coating on the survival of slash, shortleaf, and loblolly pine seedlings. The clipping and dipping treatments in these supplementary tests were similar to those in the main test. Some seedlings for the supplementary tests came from the Ashe Nursery and others from the Harrison Experimental Forest nursery. The stock received no special fertilizer treatments in the nursery. The field plantings were generally a randomized complete block design with four to six replications and 25 seedlings per plot.

## Survival Increased

In the first year's plantings of the main test, the combination of clipping and dipping gave the best early survival at all locations except the Conecuh (Table 1). Clipping alone improved survival in all plantings. The average survival, in March 1951, for the Apalachicola, Ocala, and Kisatchie plantings combined was: untreated check 20 percent, clipped 38 percent, dipped 52 percent, clipped and dipped 60 percent.

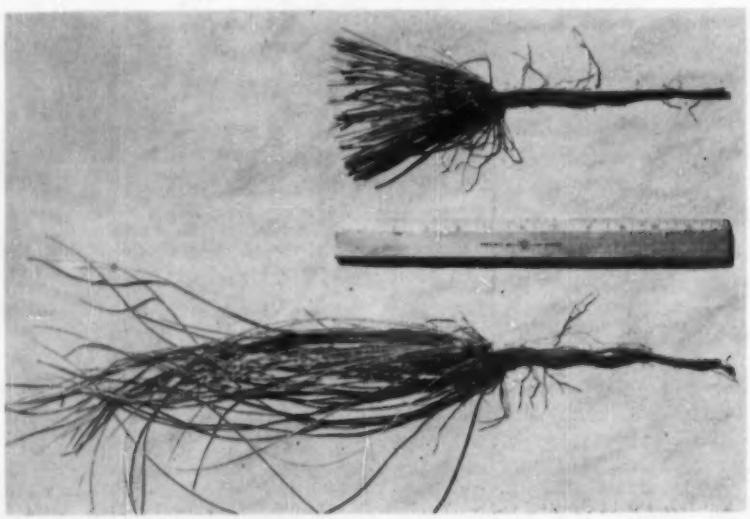

FIG. 1.—Clipping the foliage of longleaf seedlings before planting has been found to increase first-year survival 10 to 30 percent. *Left:* Unclipped seedlings. *Right:* Foliage clipped to recommended length of five inches.

*Photo, U. S. Forest Service*

[1]The trademarked product Dowax is composed primarily of paraffin wax and bentonite, with ammonium linoleate as an emulsifier (*4*).

The spring of 1951 was very dry. Precipitation from February through May was from 2 to 6 inches below average, with Florida and Alabama having the greatest deficit. The drought and the harsh sites caused most of the seedlings to die, and by June the average survival was only 1 percent for the untreated controls and 7 percent for the treated seedlings.

Although the Dowax coating generally reduced early mortality, it was not always successful. In the Conecuh planting it actually increased early mortality, possibly because planting was on February 23, about 12 days later than on the other forests.

The wax failed to increase survival in another test planted in south Mississippi on February 13, 1951. In this test the seedlings were planted the day following treatment. Survivals after eleven months were 30 percent for the untreated controls, 56 percent for the clipped seedlings, 28 percent for the dipped seedlings, and 47 percent for the clipped and dipped seedlings. Clipping increased survival in this test but the wax foliage coating did not.

In three other small tests—two in 1951 and one in 1952—Dowax-coated seedlings failed to survive any better than untreated seedlings. However, the only test in which Dowax decreased survival appreciably was in the 1951 Conecuh planting. The conditions that cause the occasional failures of Dowax to increase survival have not been determined.

In the second year's plantings of the main test the early survival was generally good to excellent on all forests (Table 2). This overall higher survival was probably due to hardier planting stock, somewhat less severe planting sites, and more rainfall than in the previous year. For the four planting areas the total rainfall for February and March averaged 7.7 inches in 1951 and 12.7 inches in 1952.

April of 1952 was dry, and precipitation from June through September was four to eight inches below average. By October only the treated seedlings on the DeSoto and the Kisatchie had adequate survival (Table 3), but clipping and dipping increased the survival significantly on all forests except the Conecuh. Differences among the three foliage treatments were not statistically significant.

TABLE 1.—SURVIVAL IN MARCH 1951

| Forest | Check | Clipped | Dipped | Clipped and dipped | Weighted average |
|---|---|---|---|---|---|
| | | | *Percent* | | |
| Apalachicola | 16 | 39 | 60 | 68 | 45 |
| Conecuh | 63 | 82 | 38 | 45 | 58 |
| Ocala | 1 | 4 | 7 | 18 | 6 |
| Kisatchie | 58 | 82 | 90 | 90 | 81 |
| Weighted average | 30 | 50 | 48 | 56 | 46 |

TABLE 2.—SURVIVAL IN MARCH 1952 OF THE 1952 PLANTINGS

| Forest | Check | Clipped | Dipped | Clipped and dipped | Weighted average |
|---|---|---|---|---|---|
| | | | *Percent* | | |
| Apalachicola | 52 | 89 | 89 | 96 | 84 |
| Conecuh | 69 | 82 | 79 | 84 | 79 |
| Ocala | 63 | 86 | 87 | 89 | 82 |
| DeSoto | 97 | 98 | 99 | 98 | 98 |
| Kisatchie | 77 | 93 | 89 | 92 | 88 |
| Weighted average | 74 | 90 | 90 | 93 | 87 |

TABLE 3.—SURVIVAL IN OCTOBER 1952 OF THE 1952 PLANTINGS

| Forest | Check | Clipped | Dipped | Clipped and dipped | Weighted average |
|---|---|---|---|---|---|
| | | | *Percent* | | |
| Apalachicola | 8 | 16 | 19 | 20 | 15 |
| Conecuh | 11 | 15 | 13 | 16 | 14 |
| Ocala | 16 | 36 | 30 | 35 | 29 |
| DeSoto | 58 | 84 | 82 | 81 | 77 |
| Kisatchie | 59 | 82 | 72 | 78 | 73 |
| Weighted average | 28 | 46 | 42 | 46 | 40 |

Since the effectiveness of these treatments is thought to be due to reduction of transpiration, direct measurements of transpiration were made. Potometer tests showed that under certain conditions clipping reduced the transpiration by 30 percent below the untreated controls, dipping in a 1:3 Dowax emulsion reduced the transpiration by 39 percent, and the combination of clipping and dipping reduced the water loss by 58 percent.

## Degree of Clipping

To get some idea of the optimum degree of clipping, a test was made in which longleaf seedlings were clipped to 4, 8, and 12 inches immediately after lifting. The foliage of the unclipped controls averaged 16 inches in length. The test was planted in south Mississippi in January 1951 and repeated in January 1952.

Six days after the 1951 test was planted the temperature dropped to 7°F. The needles of many of the seedlings (regardless of treatment) were evidently frozen, because they turned brown after several weeks. There were differences in first-year survival by treatment, however (Table 4). The results of the second planting bore out those of the first.

The survivals of the two heaviest clipping treatments were significantly better than those of the untreated control and the 12-inch clipping. The difference between the two heaviest rates of clipping was not significant, nor was the difference between the unclipped seedlings and the 12-inch treatment.

In another test, 0, 75, and 100

TABLE 4.—FIRST-YEAR SURVIVAL OF LONGLEAF PINE, AS AFFECTED BY DEGREE OF CLIPPING

| Year | Length of foliage | | | |
|---|---|---|---|---|
| | 16 inches | 12 inches | 8 inches | 4 inches |
| | *Percent* | | | |
| 1951 planting | 9 | 16 | 24 | 22 |
| 1952 planting | 70 | 72 | 90 | 82 |
| Weighted average | 36 | 43 | 60 | 52 |

TABLE 5.—THREE-YEAR SURVIVAL AND GROWTH OF PLANTED LONGLEAF PINE

| Date of clipping | 3-year survival | Seedlings over 2½ inches high in 1953 | |
|---|---|---|---|
| | | Proportion of those surviving | Proportion of number planted |
| | *Percent* | | |
| Not clipped (check) | 36 | 73 | 26 |
| Mid-September | 67 | 56 | 38 |
| Mid-October | 67 | 68 | 46 |
| Mid-November | 81 | 68 | 55 |
| Mid-December (lifting time) | 77 | 76 | 58 |

TABLE 6.—EFFECT OF STORAGE AND FOLIAGE TREATMENTS ON THE FIRST-YEAR SURVIVAL OF LONGLEAF PINE SEEDLINGS

| Length of storage (days) | Check | Clipped | Dipped | Clipped and dipped | Weighted average |
|---|---|---|---|---|---|
| | *Percent* | | | | |
| 1 | 62 | 70 | 73 | 79 | 73 |
| 3 | 57 | 69 | 73 | 72 | 70 |
| 7 | 55 | 67 | 66 | 65 | 64 |
| 15 | 38 | 49 | 48 | 46 | 46 |
| Weighted average | 53 | 64 | 65 | 66 | 63 |

percent of the foliage was removed just before the seedlings were planted in a sand bed in the nursery on the Harrison Experimental Forest on March 13, 1951.

In spite of frequent waterings the survival of the unclipped controls, four months after planting, was only 7 percent. The seedlings that had three-fourths of their foliage removed survived 33 percent, and those with all of their foliage removed, 50 percent.

Clipping to five inches, the length used in the main study, works well for average sites but is not necessarily optimum for all conditions. A different degree of clipping may be worthwhile on harsh sites.

A practical consideration is that foliage much shorter than five inches is hard to handle in machine planting and may result in a large percentage of seedlings being planted too high. However, machine planters should be able to set seedlings clipped to five inches just as well as unclipped ones.

### Time of Clipping

Work at the peak of the nursery lifting season would be reduced if clipping could be completed before lifting begins. To find out what effect early clipping has on survival and growth, longleaf seedlings were clipped in the nursery bed in September, October, November, and December. All but four inches of the foliage was removed. The stock was planted on December 18, 1950, three days after the December clipping. An unclipped control was also planted. There were no significant differences in green weight, oven-dry weight, or root-collar diameter of laboratory samples taken from the clipped plots in the nursery.

The average first-year survival was 74 percent for the clipped seedlings and 36 percent for the unclipped. Three years after planting the survival was essentially the same as the first year (Table 5). The difference in survival between the two early clipping dates and the two later clipping dates was significant. After three years in the field, 76 percent of the surviving December-clipped seedlings were over 2.5 inches in height. Thus the clipped seedlings survived and grew better than the unclipped controls, and the seedlings clipped in December performed a little better than those clipped earlier.

### Effects of Storing

The poor survival of the dipped seedlings in the 1951 Conecuh planting aroused suspicion that storage might harm wax-coated seedlings. To test this possibility, bundles of seedlings that had been either clipped to a length of five inches, dipped in a 1:5 or a 1:3 Dowax emulsion, or both clipped and dipped were packed in regular shipping bales and held in an unheated building for 1, 3, 7, and 15 days before being planted. Untreated seedlings were stored the same length of time. The bales were watered every other day. The test was repeated three times. Seedlings from two different nurseries were used on two different planting sites. The planting of the first test started on January 8, 1952, and the planting on the last test started on February 19, 1952. The data in Table 6 are averages of the three tests.

Increasing the storage period reduced the survival in all categories, but the treated seedlings survived better than the untreated seedlings. The difference between the 1:3 and 1:5 concentrations of Dowax was not significant and the data are not presented.

### Other Species

In January 1951 a planting was made in south Mississippi to test longleaf, slash, loblolly, and shortleaf seedlings that had been dipped in a 1:3 concentration of Dowax.

This test was planted just before the hard freeze mentioned previously. When the plantation was ex-

amined several weeks after the freeze, the foliage on the longleaf seedlings had turned brown, but the other species showed no ill effects. The first-year survival of the longleaf was only 28 percent, while the slash, loblolly, and shortleaf averaged 53, 53, and 61 percent respectively. There was no difference in survival between dipped and undipped seedlings.

In January 1952 another planting was made of slash and loblolly seedlings that had been dipped in a 1:3 concentration of Dowax. In this test the average first-year survival of the dipped slash seedlings was 55 percent, as compared to 40 percent for untreated controls. Average loblolly survival was 75 percent for dipped seedlings and 57 percent for undipped. There were no significant interactions between species and treatment.

### Recommendations

The needles of longleaf planting stock should be clipped. Clipping to five inches appears adequate for most sites.

Clipping should be done near the time of lifting. If seedlings are clipped in the nursery bed, the work should, in normal circumstances, start no earlier than November.

Wax foliage coatings should be used only on a trial basis until more is known about employing them effectively.

If the period of storage between lifting and planting is kept at a minimum the chances of getting good field survival are improved. This applies to both treated and untreated stock.

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## Grafted Selections of Eastern White Pine Tested for Resistance to Blister Rust


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SINCE ITS introduction into this country from Europe, white pine blister rust (caused by *Cronartium ribicola* A. Fischer) has continually threatened the five-needle pines. The cost of Ribes eradication in various situations has discouraged the planting of white pine on many otherwise good sites. Another approach to the problem of maintaining white pine and of supplementing the eradication program has been the use of trees showing resistance to rust (*2*). This study was initiated in cooperation with Dr. A. J. Riker of the University of Wisconsin in order to test further some of his selections of white pine for resistance to blister rust. For this study, 64 grafts were secured from stock selected from 40 different parent trees, and tested as already described (*2*).

### Methods of Procedure

The scions were grafted to the root stocks of commercial seedlings in February and were grown in a greenhouse during the late winter of the year of outfield planting. A side graft technique was used, and the graft unions were bound with rubber budding strips. Commercial 2-1 white pine seedlings, also of Wisconsin origin, were used as controls.

In 1949, the grafts and the control seedlings were planted on an island in Basswood Lake 20 miles northeast of Ely, Minn. (*1*). This island, a 12-acre tract, supported a heavy infection of blister rust. The vegetation on the island consisted of mature, sapling, and seedling white pine, balsam fir, white cedar, and other native species. Skunk currant (*Ribes glandulosum* Grauer) was growing in abundance, with mountain maple (*Acer spicatum* Lam.) the dominant species in the brush layer.

In each planting area the ground was prepared with a mattock to remove the sod layer and to loosen the soil. The grafts were taken from their pots and set into the ground with the graft union at the soil line in order to prevent breakage from wind whipping. Close observations of the grafts were made during the first growing season. Where the budding strips had not deteriorated they were removed in order to prevent tissue constriction. The controls were set into the ground at the same depth or slightly deeper than they were found growing in the nursery. Both grafts and controls were planted 5 feet apart in the test plots.

Eight test plots were established, some along the south aspect of the island where aeration and light were relatively favorable to tree growth and some along the north aspect where conditions were not as favorable. Near every plot, Ribes bushes were in abundance. Deer- and rabbit-proof exclosures were erected around each plot.

Once a month throughout the growing seasons during the 6-year test period, a tagged Ribes bush either in the plot proper or within 3 to 15 feet of it was examined for the incidence of rust infection. The grafts and control seedlings were examined for rust in June and September of each year. The exclosures were weeded when necessary to eliminate competition. Several of the plots were sprayed to control white pine bark aphids.

### Results

The tagged Ribes bushes were examined monthly during the growing seasons for feet of live stem, number of living leaves, number

TABLE 1.—INCIDENCE OF RUST OF RIBES BUSHES[1]

| Plot number | Average live stem examined (feet) | Average leaves examined (number) | Average leaves infected (number) | Leaves infected (percent) |
|---|---|---|---|---|
| I | 7.0 | 67 | 14 | 21 |
| II | 2.3 | 10 | 2 | 20 |
| III | 3.6 | 16 | 4 | 22 |
| IV | 4.2 | 10 | 3 | 30 |
| V | 5.3 | 36 | 5 | 14 |
| VI | 1.4 | 17 | 7 | 40 |
| VII | 3.5 | 18 | 6 | 35 |
| VIII | 2.5 | 21 | 3 | 16 |

[1]In all cases, numbers given are averages for monthly observations each year for 6 years.

TABLE 2.—GROWTH, INFECTION AND MORTALITY OF SELECTED GRAFTS AND CONTROL SEEDLINGS FOR SIX YEARS

| Plot number | Grafts and controls (number) | | Average annual growth (inches) | Trees infected (percent) | Dead from Rust (number) | Dead from other causes (number) |
|---|---|---|---|---|---|---|
| I | g[1] | 11 | 9.2 | 28 | 0 | 4 |
| | c[1] | 7 | 6.7 | 100 | 4 | 1 |
| II | g | 7 | 4.9 | 0 | 0 | 2 |
| | c | 9 | 5.2 | 89 | 3 | 0 |
| III | g | 10 | 4.4 | 0 | 0 | 2 |
| | c | 5 | 5.8 | 80 | 2 | 0 |
| IV | g | 8 | 3.6 | 0 | 0 | 5 |
| | c | 8 | 4.5 | 100 | 5 | 1 |
| V | g | 5 | 3.0 | 0 | 0 | 0 |
| | c | 4 | 5.1 | 67 | 1 | 1 |
| VI | g | 5 | 2.4 | 0 | 0 | 2 |
| | c | 5 | 4.2 | 50 | 0 | 1 |
| VII | g | 9 | 3.6 | 0 | 0 | 2 |
| | c | 9 | 5.9 | 11 | 1 | 0 |
| VIII | g | 9 | 3.8 | 0 | 0 | 5 |
| | c | 24 | 4.8 | 36 | 0 | 2 |
| Totals | g | 64 | 34.9 | 5 | 0 | 22 |
| | c | 71 | 42.2 | 58 | 16 | 6 |

[1]g = grafts, c = controls.

of leaves infected, and percent of infected leaf surface bearing uredial, telial, and necrotic areas. These data are summarized in Table 1. With the exception of plot V, most of the plots on the north aspect of the island showed somewhat higher percentages of infection than the plots on the south aspect. Plot V lay at the bottom of a steep hill on the south, and in the other directions was screened from the lake by a dense stand of conifers. These conditions may have helped reduce the incidence of blister rust in this plot. The observations indicated that rust occurred during the growing season near the trees being tested.

For the 6-year period, a total of 64 grafted selections showed 5 percent rust infection, and the 71 controls showed 58 percent infection. This low rate of rust infection on the grafts confirmed the results of Riker *et al.* (*2*) in their tests of grafted selections made from trees which had withstood natural exposure to blister rust for 15 years (*3*). Rust infection of grafted selections occurred only in plot I. Here, of the 11 grafts 2 had cankers. On one tree the canker was normal, but on the other, some resistance appeared (*4*). Of the 7 control seedlings in this plot, 6 were infected.

In all plots, most of the rust infection began in 1950 and 1951. Heavy incidence of rust on the control seedlings was found in all plots with the exception of plot VII. Possibly the heavy growth of mountain maple and conifers as well as the steep topography interfered with spore dispersal.

## Growth of Grafts and Controls

There was consistently better growth on the control seedlings than on the grafted selections, a difference of 7.3 inches between them for the 6-year period. The one exception was in plot I where the grafted selections showed better growth than the controls (Table 2). Since the controls were not grafts, it may be that the graft unions on the selected stock interfered with normal growth. The scions often grow more slowly because of union on only one side. In some cases physiological incompatibility has appeared. Sometimes 10 to 20 percent of the grafts fail, even though the graft has formed apparently satisfactory callus to unite scion and stock (Riker, correspondence). Eight of the surviving 42 grafts showed normal, erect growth. The remaining 34 were either angled or prostrate in form.

Of the 49 living controls, 48 had normal, erect development and only one was prostrate following a heavy aphid attack. Although some of the grafts showed heavy aphid damage, both they and the aphid-free grafts developed the prostrate form during their first year in the field, prior to any aphid attack, and continued this form over the 6-year period. Although the plots on the north aspect of the island in heavier shade conditions showed this deformity very strikingly, it was also obvious in plots on the south aspect where more favorable light conditions existed.

The cause of this leaning or prostrate form is not clear. The possibility that snow flattened the grafts during the winter and that they have not yet regained the upright habit has been suggested in results from other areas, particularly in plantings where the grafts were more or less shaded (Patton and Riker, correspondence). Another possibility is that the scions from lateral branches of the lower part of a tree may take some time to assume the upright habit of growth, especially in partial shade. This situation emphasized the desirability of trying top grafts on well established trees.

## Summary

In 1949 grafted selections of white pine were planted on a rust-infected island in Basswood Lake, Minnesota, and were tested during 6 growing seasons for resistance to white pine blister rust. Results

showed a 5 percent infection on the grafted stock and 58 percent infection on the control seedlings.

The grafted stock had a somewhat poorer growth rate than the control seedlings, and the incidence of an undesirable prostrate form was high among the grafted selections.

Mortality due to causes other than blister rust was greater for the grafts than for the control seedlings.

These tests seem to indicate that there is a very high rust resistance among the selections. Further study is necessary to improve the survival as well as the rate and form of growth of the grafts.

TABLE 3.—FORM OF GRAFTS AND CONTROLS[1]

| Plot number | Planting type | Growth erect (number) | Growth angled (number) | Growth prostrate (number) |
|---|---|---|---|---|
| I | grafts | 4 | 2 | 1 |
| | controls | 2 | 0 | 0 |
| II | grafts | 1 | 4 | 0 |
| | controls | 6 | 0 | 0 |
| III | grafts | 1 | 6 | 0 |
| | controls | 2 | 0 | 1 |
| IV | grafts | 1 | 1 | 1 |
| | controls | 2 | 0 | 0 |
| V | grafts | 0 | 0 | 5 |
| | controls | 2 | 0 | 0 |
| VI | grafts | 0 | 0 | 3 |
| | controls | 4 | 0 | 0 |
| VII | grafts | 0 | 3 | 4 |
| | controls | 8 | 0 | 0 |
| VIII | grafts | 1 | 3 | 0 |
| | controls | 22 | 0 | 0 |
| Totals | grafts | 8 | 19 | 14 |
| | controls | 48 | 0 | 1 |

[1]This table includes only those trees still surviving at the end of 6 years.

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## SCHOOL BOX SCORE[1] 1955 MEMBERSHIP

| School | Student applications received: Oct. 1955 | Total 1954 | Total 1955 |
|---|---|---|---|
| Alabama Polytechnic Institute | 11 | 25 | 11 |
| University of California | 0 | 11 | 17 |
| Colorado A & M College | 0 | 18 | 5 |
| Duke University | 0 | 13 | 2 |
| University of Florida | 0 | 8 | 7 |
| University of Georgia | 1 | 35 | 14 |
| University of Idaho | 0 | 29 | 4 |
| Iowa State College | 0 | 21 | 15 |
| Louisiana Polytechnic Institute | 0 | 0 | 13 |
| Louisiana State University | 0 | 14 | 30 |
| University of Maine | 0 | 20 | 12 |
| University of Massachusetts | 0 | 12 | 4 |
| Michigan State University | 0 | 43 | 10 |
| University of Michigan | 0 | 28 | 14 |
| University of Minnesota | 0 | 23 | 11 |
| University of Missouri | 0 | 14 | 3 |
| Montana State University | 0 | 19 | 21 |
| State University of New York | 0 | 22 | 23 |
| North Carolina State College | 0 | 39 | 0 |
| Oregon State College | 0 | 18 | 19 |
| Pennsylvania State University | 0 | 37 | 32 |
| Purdue University | 0 | 26 | 4 |
| Utah State Agricultural College | 0 | 9 | 12 |
| University of Washington | 0 | 35 | 23 |
| West Virginia University | 0 | 22 | 6 |
| Yale University | 0 | 4 | 16 |
| Totals | 12 | 545 | 328 |

[1]Adjusted to new record year—now calendar-year basis.

## SECTION BOX SCORE[1] 1955 MEMBERSHIP

| Section | Applications received[2]: Oct. 1955 | Total 1954 | Total 1955 |
|---|---|---|---|
| Allegheny | 0 | 72 | 43 |
| Appalachian | 2 | 69 | 11 |
| Central Rocky Mountain | 0 | 26 | 6 |
| Central States | 1 | 115 | 20 |
| Columbia River | 3 | 57 | 71 |
| Gulf States | 2 | 63 | 84 |
| Inland Empire | 0 | 40 | 8 |
| Intermountain | 0 | 15 | 18 |
| Kentucky-Tennessee | 2 | 5 | 7 |
| New England | 1 | 54 | 41 |
| New York | 1 | 39 | 33 |
| Northern California | 1 | 24 | 30 |
| Northern Rocky Mountain | 0 | 34 | 37 |
| Ozark | 0 | 42 | 19 |
| Puget Sound | 2 | 69 | 52 |
| Southeastern | 14 | 130 | 50 |
| Southern California | 0 | 2 | 3 |
| Southwestern | 0 | 7 | 11 |
| Upper-Mississippi Valley | 0 | 55 | 34 |
| Washington | 0 | 8 | 2 |
| Wisconsin-Michigan | 1 | 13 | 25 |
| Totals | 30 | 939 | 605 |

[1]Adjusted to new record year—now calendar-year basis.

[2]Student, Junior, Affiliate, Associate (initial) grades only.

# Notes

## Additional Information on Prescribed Burning in Virgin Ponderosa Pine in Arizona

A 65,000-acre test of prescribed burning in virgin ponderosa pine on the Fort Apache Indian Reservation of east-central Arizona has been described in detail by Weaver.[1] He points out that one of the greatest benefits of the burning was the reduction of fuels, especially heavy dead material such as snags and windfalls.

The real payoff in hazard reduction is an easier job of controlling wildfire. During the first three fire seasons following the 1950 prescribed burning, fire damage on the 65,000 acres treated was very strikingly reduced. Table 1 compares wildfire statistics, before and after treatment, on the prescribed-burned area with comparable figures on the 791,000 acres of the Fort Apache reservation that have not been prescribed burned. The table shows that prescribed burning may be credited with an 82-percent reduction in number of fires, a 94-percent reduction in area burned, and a 65-percent reduction in size of average fire over the 3 years. In addition, the chance of a "blowup" fire in remote areas was considerably reduced. While it is possible that part of the credited reduction in wildfire was due to factors other than the reduced hazard, it is believed that the prescribed burning was primarily responsible.

The prescribed burn was about as effective in reducing wildfire damage the third season following burning as it was the first. Hazard is, of course, building up again as dead grass and needles accumulate and as trees die from natural causes. Snags that were burned down and old resinous wood that was consumed will be replaced much more slowly. Since hazard accumulation is progressive, it may be difficult to select a time when the reduction ceases to be effective.

Summer-season lightning is responsible for practically all fires in the prescribed-burned areas. By contrast, most "blowup" fires in the Southwest have been man-caused during late spring. It is debatable whether or not prescribed burning would be as effective in reducing fire damage in the accessible areas, where most man-caused fires occur, as in the remote areas of the Fort Apache test. We believe that considerable wildfire reductions can be effected in accessible areas.

Weather may limit the use and affect the cost of fire as a forestry tool in the Southwest; the cost of the 1950 operation was unusually low. August and September that year were quite dry, and October and early November were nearly rainless. Heavy fuels were therefore unusually dry and burned easily when cold, dry, late November weather permitted safe burning at minimum cost.

By contrast, August-September rains in 1951, 1952, and 1953 were in the normal range and considerable rain and snow came with the cold weather of late fall. Burning in the 1950 pattern was not possible.

In 1954, August-September rains were above normal, but late November and early December were dry and cold as in 1950. Several thousand acres of virgin ponderosa pine were burned with very limited damage, but heavy fuels apparently had a considerably higher moisture content than in November 1950, as cleanup of heavy fuel was much less complete than in 1950.

A review of 46 years of records from the Fort Valley Experimental Forest (150 miles northwest of Fort Apache) shows that only one other year had an August 1—December 1 general rainfall pattern

TABLE 1.—REDUCTION IN WILDFIRE ATTRIBUTABLE TO PRESCRIBED BURNING IN VIRGIN PONDEROSA PINE, FORT APACHE INDIAN RESERVATION

| Period | Avg. annual no. fires per 1,000 acres protected | | Avg. annual area burned per 1,000 acres protected | | Size of average fire | |
|---|---|---|---|---|---|---|
| | Prescribed burned | Untreated | Prescribed burned | Untreated | Prescribed burned | Untreated |
| | *Number* | *Number* | *Acres* | *Acres* | *Acres* | *Acres* |
| Before treatment (1948-50) | 0.620 | 0.273 | 10.57 | 6.18 | 17.05 | 22.66 |
| After treatment (1951-53) | .108 | .261 | .09 | .83 | .83 | 3.18 |
| Reduction: | | | | | | |
| Gross | 82.6% | 4.4% | 99.1% | 86.6% | 95.1% | 86.0% |
| Attributed to treatment[1] | 82% | | 94% | | 65% | |

[1] Percent reduction attributable to burn $= 100 \frac{(Ru - Rt)}{Ru}$, where

*Ru* is ratio of 1951-53 period to 1948-50 period for untreated area
*Rt* is ratio of 1951-53 period to 1948-50 period for treated area
Example to show reduction in number of fires per 1,000 acres:

$$Ru = \frac{.261}{.273} = .956$$

$$Rt = \frac{.108}{.620} = .174$$

$$\text{Percent reduction attributable to burn} = 100 \frac{(.956 - .174)}{.956} = 82\%$$

[1] Weaver, Harold. A preliminary report on prescribed burning in virgin ponderosa pine. Jour. Forestry 50: 662-667. 1952.

like that of 1950, and only two additional years had a nearly rainless October-November as did 1954. Thus it appears that in only 5 years out of 46 would cheap, extensive, late-November burning have been feasible, and in 3 of the 5 reduction of heavy-fuel hazard would have been below the 1950 level.

If prescribed burning is attempted under other than these ideal conditions, different and much more costly techniques will be required. Much smaller burning units must be used so that the fire can be completed during a very short period of permissible burning weather. Much more study is needed to define the conditions under which this small-scale burning may be done safely.

Weaver[2] describes prescribed-burning damage that was apparent immediately after the 1950 operation. Now, 4 years later, it appears that the most serious damage was the occasional burning down of a butt-scarred tree and the occasional scarring of a healthy tree. Here and there seedlings, saplings, or poles were killed that were needed for optimum stocking, but the area so affected is a very small part of the total burned. Complete destruction of the duff, which according to Fuller, Shannon, et al[3] can be used as a criterion of damage to soil, was largely limited to areas under and immediately adjacent to windfalls and other pieces of heavy fuel that burned with considerable heat.

Prescribed burning can be justified only if the total benefits, including insurance values and lower protection costs, exceed damage plus cost of operation. Data are not available for such an economic analysis of the 1950 burn. Bureau of Indian Affairs personnel who conducted or observed the project believe that such an analysis would justify the burn.

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[2]Op Cit.

[3]Fuller, W. H., Stanton Shannon, and P. S. Burgess. Effect of burning on certain forest soils of northern Arizona. Forest Sci. 1:44-50. 1955.

## Further Observations on Ponderosa Pine in New York

In July 1955, the writer had occasion to visit the plantation of ponderosa pine in Clinton County, N. Y., which has been described in a previous note in the JOURNAL.[1]

This plantation is maintaining height growth and is reproducing in an open field to the west of the stand and also within the stand itself. Seedlings are extremely abundant adjacent to the stand on the southwest corner and a sapling group has become established at a distance of about 100 feet. These trees are eight to ten feet high and 12 to 15 years of age. One such tree shows a canker caused by the sweetfern rust (*Cronartium comptoniae*, Arth.). Sweetfern is abundant here and uredinia were found on some of the leaves.

Two trees were cut this past year by the owner who described the lumber as "just like Norway pine."

Notwithstanding its long continued exposure to the rust, this plantation now 45 years old, appears well on the way toward producing a mature stand of ponderosa pine in this eastern environment.

E. W. LITTLEFIELD
*Conservation Department, Albany, N. Y.*

[1]Littlefield, E. W. A plantation of ponderosa pine in northern New York. Jour. Forestry. 42:364-365. 1944.

## A Test of Krilium Soil Conditioner in Gully Planting

Krilium, a synthetic polyelectrolytic material developed by the Monsanto Chemical Company, has frequently been found better than compost or peat moss for improving the physical characteristics of certain clayey soils. "Gully rangers" striving to rehabilitate critically eroded areas in north Mississippi hoped that Krilium would prove effective in establishing pine on denuded eroding sites. However, in a recent test on some eroded subsoils near Oxford, Mississippi, Krilium failed to improve survival of planted loblolly pine seedlings.

### Location and Design

Five study blocks were located near the eastern edge of the brown loam area of north central Mississippi. Two blocks were on Lexington silty clay loam subsoil, typical of many gully bottoms in the loessial brown loam area. Two others were on mixed sandy clay Coastal Plain parent material, representing gully bottoms in the Coastal Plain areas farther east. The fifth block was on a hardpan layer of Providence silty clay loam subsoil. The topsoil from all blocks had been removed mechanically for road construction material.

Each of the five blocks included four treatment plots about 18 feet square. At time of treatment, in May 1952, each plot contained nine living loblolly seedlings field-planted in the spring of 1951 or 1952.

Treatments randomly assigned to each block included Krilium formulation #6, Krilium formulation #9 (a finer, more hygroscopic form), cultivation without chemical, and, as a check or control, no treatment.

Krilium was broadcast by hand at the rate of 1 pound per 100 square feet of surface, or the equivalent of 436 pounds per acre, and was well mixed with hand tools to a depth of three inches. This resulted in a Krilium concentration in the top three inches of about 0.04 percent of the weight of the soil. The top three inches on cul-

tivated plots was pulverized with hand tools in the same way as on the Krilium plots.

### Results

On the basis of this test, Krilium offers little promise in loblolly erosion-control plantings on hard-packed kaolinitic subsoils typical of north Mississippi gully bottoms.

TABLE 1.—AVERAGE SURVIVAL AND HEIGHT GROWTH OF LOBLOLLY SEEDLINGS AFTER THREE GROWING SEASONS, 1954

| Treatment | Survival | Height growth |
|---|---|---|
| | *Percent* | *Inches* |
| Krilium #6 | 80 | 10 |
| Krilium # 9 | 87 | 10 |
| Cultivated | 91 | 12 |
| Control | 71 | 8 |
| Average | 82 | 10 |

Three growing seasons after treatment, overall survival of the loblolly seedlings averaged 82 percent (Table 1). Survival was highest (91 percent) on the cultivated plots and lowest (71 percent) on controls. By chi-square analysis, variation in survival among treatments was not significant although variation among blocks (from 44 to 97 percent) was highly significant.

Growth was generally very slow because of the severity of the sites. Overall height growth during the three growing seasons averaged 10 inches and ranged from 12 inches on cultivated plots to 8 inches on controls (Table 1). Block averages ranged from 18 to 4 inches, with average growth on the two blocks of extremely adverse Coastal Plain parent materials being only 6 and 4 inches. Differences in height growth among treatments were not significant, and those among blocks were highly significant.

D. B. KING
*Tallahatchie Research Center,*[1] *Southern Forest Experiment Station, Forest Service, U. S. Department of Agriculture*

[1]Maintained in cooperation with the University of Mississippi.

## Freezing Injury to Young Sugar Pine

Twice in recent years young sugar pines have proved more susceptible to freezing than ponderosa and Jeffrey pines. Many young seedlings—up to 6 weeks old—were killed; older plants—those that had completed at least 1 year's growth—were severely damaged.

The first striking case of freezing damage was observed at the Stanislaus Experimental Forest nursery in 1950. Evidently it was associated with a sharp drop in temperatures during the period September 30 to October 2. Maximum and minimum air temperatures in a weather shelter 4.5 feet above the ground before, during, and immediately following the critical period were:

| | Minimum (°F.) | Maximum (°F.) |
|---|---|---|
| Previous week | 34-37 | 74-76 |
| Sept. 30 | 18 | 57 |
| Oct. 1 | 18 | 57 |
| Oct. 2 | 23 | 70 |
| Following week | 27-34 | 65-81 |

By October 10 all of the terminals of the 1-0 sugar pines in two 4- by 12-foot seedbeds had turned brown. Ponderosa and Jeffrey pines of the same age in adjacent seedbeds showed no evidence of injury.

The second instance was associated with a late spring frost in 1954. Considerable damage occurred to young sugar pines in a test planting near Fish Camp in Mariposa County. Minimum temperatures of 27°F. were recorded at the south entrance to Yosemite National Park on June 5, 6, and 10. The minimum temperatures at the planting site, which was on an exposed ridge about 1,000 feet higher in elevation than the recording station, may have been considerably lower—possibly as much as 10 degrees.

The freeze was more damaging to new sugar pine seedlings in seed spots than to 3-year-old transplants set out the preceding spring. Some of the seed spots were protected from rodents by wire screens. In unscreened seed spots, 74 percent of the seedlings were killed. No transplants were killed even though all or most of the new growth was damaged on 66 percent of the transplants. Ponderosa and Jeffrey pines randomly intermingled among the sugar pines sustained very little damage. Only 7 percent of the 2-year-old ponderosa pine transplants were affected by the freeze, and none died; only 9 percent of the ponderosa pine and 8 percent of the Jeffrey pine seedlings in unscreened seed spots were killed.

Wire screens, besides keeping rodents out, protected the young seedlings from freezing. Only 31 percent of the sugar pine seedlings under wire screens were killed compared to the 74 percent that were destroyed in unscreened seed spots. Losses among screened ponderosa and Jeffrey pine seedlings were also lower. For ponderosa pine, only 4 percent of the seedlings under wire screens were killed by the freezing; for Jeffrey pine, only 1 percent.

In all instances, the seed from which the subject trees originated were collected from natural stands in seed zone No. 4.[1] This is the same seed zone in which the plantings were conducted. Hence, considerable reason exists to suppose that geographic origin of the stock had not biased the results.

The differences in susceptibility to freezing may contribute, in part, to differences in natural distribution of the species.

GILBERT H. SCHUBERT
*Forester, Division of Forest Management Research, California Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture*[2]

[1]Fowells, H. A. Forest tree seed collection zones in California. California Forest and Range Expt. Sta. Res. Note 51, 5 pp., illus.

[2]The California Forest and Range Experiment Station is maintained at Berkeley, Calif., in cooperation with the University of California.

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# Points of View

## Comments on "Results of an Investigation of the Variable Plot Method of Cruising"

I should like to call attention to an error of fact appearing in Professor Bertram Husch's article[1] on point-sampling on page 571 of the August 1955 JOURNAL OF FORESTRY. No bias or error will result from counting the same tree from more than one estimating point, as long as the estimating points are located in an unbiased fashion. The sampling points constitute a dot-grid, which estimates the mean number of tree-circles per dot; no bias is introduced if two or more dots fall in the same tree-circle, and no error will result if his minimum distance between estimating points is ignored. It is a form of sampling with probability proportional to size and with replacement; the technique is unbiased.

[1]Husch, Bertram. Results of an investigation of the variable plot method of cruising. Jour. Forestry 53:570-574. 1955.

Similarly, no error will result in conventional area sampling (plot cruising) if plots overlap, as long as they are located in an unbiased manner. Area sampling with replacement is just as valid as area sampling without replacement, although there is usually an incentive to employ the latter, at least where the sample will constitute an appreciable portion of the whole. With replacement, there is a chance of sampling given areas two or more times without biasing the results.

Unfortunately, a definite edge-effect bias may be introduced by Professor Husch's advocacy on page 571 of staying D distance away from tract boundaries, especially on small areas where the periphery has quite a different tree density from the interior. Instead, a more valid policy is to use the usual random-start procedures for systematic sampling, and at all points near the boundaries to sweep only the interior 180°, 120°, 90°, or 60° with the angle-gauge, depending on boundary configuration. Each such count would then be multiplied by 2, 3, 4, or 6.

Although Professor Husch's misconceptions as to overlap and edge-effect do not affect his conclusions in this article, if allowed to stand unchallenged they might cause confusion among those using point-sampling in thinning, stand structure analysis, etc., and might encourage people to inject edge-effect bias into their point-sampling.

L. R. GROSENBAUGH
*Southern Forest Experiment Station, Forest Service, U. S. Department of Agriculture*

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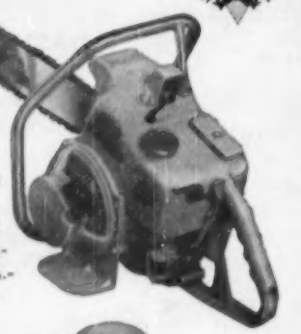

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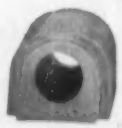

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## Comments on "Forest Growing Stock"

I was glad to see the emphasis on the determination of desirable growing stock in Mr. Gross' article in the June 1955 JOURNAL[1] but feel that certain points in concept and procedure call for comment.

My main point is that his use of "normal growing stock" as a goal or guide rather distinct from "desired growing stock" seems to accomplish little useful purpose as handled, and leads up a blind alley. The principal reason is reliance on and acceptance of normal yield tables as the basis. These tables have many uses. But they also have distinct limitations and one of them is that they do not give a good measure of desirable growing stock under management, despite the fact that they are handy to illustrate the nature of growing stock problems and often have been so used. They do not relate to managed stands and only armstrong methods make them seem to. Gross says: "They show maximum possible production." Strictly, they show near-maximum observed *volumes* per acre of natural, unmanaged, even-aged stands at different ages. No more and no less. They do not measure or relate directly to maximum harvestable *yields* that may be obtained from a managed forest in which a number of partial and harvest cuttings may be made and a stand structure maintained that may be considerably at variance with that portrayed by normal yield tables. Gross is well aware of this and yet: "Nevertheless, the determination of normal growing stock" [based directly on normal yield tables] . . . "is an important step. . ." And further: "Even though normal growing stock cannot be attained under management, it is highly desirable to determine this value in order to decide where to set the goal of 'desired growing stock' which is discussed later." Just *why* it is "highly desirable" eludes me as I submit that normal yield tables do not actually help you much in setting a desired goal. Certainly not in any economic sense. The main connection is through arbitrary grabbag use of a stocking percentage which is a shifty figure and especially when used to compare cut with uncut stands. Reliance on yield tables is more likely to divert than to help one in making a direct attack on the question of what does constitute desirable growing stock under particular management conditions. Why make a detour up the "normal" alley?

The difficulty with rather arbitrary use of this "normal" concept is especially apparent in Gross' treatment of uneven-aged management. He says that the growing stock for an uneven-aged forest "theoretically should be the same" as that of a forest consisting of even-aged stands in equal pro-

[1]Gross, L. S. Forest growing stock. Jour. Forestry 53:403-408. 1955.


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portions covering the same area, and further that normal growing stock for an uneven-aged forest can be determined by summation of normal yield table data for even-aged stands. One obvious trouble with this is that even-aged yield tables rather naturally rarely exist for forest-types that can successfully be handled on a true selection basis and consequently couldn't be used even if it was a good idea. Another difficulty is that attempting to synthesize growing stock for an uneven-aged stand from even-aged data necessitates that a particular rotation be assumed, something that you don't really know and which isn't a structural part of uneven-aged management. A deeper question is whether an uneven-aged forest is just the same thing as an equal area of graduated even-aged stands as represented by normal yield tables but all mixed up. The concept may be convenient but is it true? I doubt it for a number of biological as well as practical management reasons.

Another point, at least debatable, is the assertion that group selection is "a form of even-aged management." Silviculturally, it is just as much a form of selection; it all depends on the size and distribution of the group cuttings and what is done on the ground. The groups are not necessarily even-aged and border effects may be substantial so that trees are not actually growing under truly even-aged stand conditions. Further, it would seem that to constitute even-aged *management* these groups would have to be actually mapped, inventoried, and handled as operable stand units, something that is seldom practicable or done in managing areas having group-wise tree distribution. It is possible and entirely logical that a forest be organized on an uneven-aged framework from an over-all operating standpoint but silviculturally treated, at least in part, as an aggregation of small even-aged stands. A clear distinction should be made between actual silvicultural t r e a t m e n t on the ground and the general management framework which practical circumstances may dictate.

It is perfectly true that good old Von Mantel's formula, as used by Gross, will give a short cut for estimation of total growing stock —if you are willing to assume that growing stock *averages* linear from zero to yield at rotation age. It is useful as a simple expression of progression and general growing stock relationships, but it is exceedingly crude; why bring it in here? In relation to desirable growing stock, it can give all kinds of results, for both cubic foot and board foot measure, depending on the forest type and length of rotation. Direct summation is arithmetically more accurate—of yield table values—but not necessarily more accurate in so far as representation of desirable growing stock under management is concerned.

In this connection, footnote 1 of Table 1 confuses me. It states: "One half tabular value because this age class will be cut in this period." No period is stated and Gross seems to overlook the fact that in summation of arithmetic series, which is all that is involved here, half of the last term in the series is taken for strictly mathematical reasons that have nothing whatever to do with forestry. There seems to be a persistant attempt to read some forestry into the summation arithmetic.

The rather unhelpful nature of normal yield tables in contributing to specification of desirable growing stock under management seems to be further shown in Gross' illustration from the Davy Crockett National Forest. He says that desirable growing stock was set at around 50 percent of applicable yield table values with no economic

(Continued on page 738)

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or physical reason given. Even so, no apparent use of calculated growing stock determined on this basis was made in calculating the 10-year allowable cut which is the only real management decision made. The crux is to decide *how fast* one can afford to build up what kind of growing stock. The decision to cut 36 percent of the growth and leave 64 percent on the national forest units is basically managerial and has nothing to do with normal yield tables. It would seem that the fact that present stands are understocked and should be built up could be determined, and probably was, without much dependence on yield tables. As Gross says, further experience and study is needed to set meaningful growing stock goals under management.

Incidentally, as a matter of growth biology one wonders whether periodic annual accretion to growing stock and cut are really directly additive to total growth in the simple fashion shown in Table 2. At the beginning of a period there is a certain growing stock. It grows at some rate, unknown by specific years, but basically compound. Cutting introduces a variable, as how it is done, when, and where has much influence on net growth that will be made in a given period. If total net growth for the 10-year period is first estimated, as I expect was done here, then cut is not likely to be a simple subtraction from it with the total net growth remaining constant. Without knowledge as to precisely how the cut was determined and is to be applied, it is not possible to appraise the reality of the accretion figure.

My whole point in this matter is that determination of desirable growing stock, certainly a central problem of management, should be based on a direct appraisal of applicable silvicultural knowledge and management objectives. Reliance on normal yield tables, as we have them, is essentially a detour and tends to lead to arbitrary and unhelpful arithmetical manipulations. Normal yield tables do not

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represent "normal" managed stands in any true sense of the word. Basic semantic confusion as well as practical difficulties result from the concept of normal growing stock and increment, based on normal yield tables, as a management guide. I wish that use of the word "normal" could be limited to normal yield tables, which we have with us to stay, but otherwise buried beyond recall. Why not speak directly of the requirements of a fully regulated forest and the need for working toward desirable and balanced stocking and distribution of size classes in shaping up a continuously productive forest in line with best biological knowledge and the purposes of management. Normal yield tables have some uses in this connection but no special basing-point virtue. Here is one place where perhaps tradition gets in our hair.

KENNETH P. DAVIS
*University of Michigan*

# Reviews

**Forests of California**

By California Department of Natural Resources. 147 pp. Illus. State Printing Plant, Sacramento 14, Calif. 1955. 60 cents.

This excellent publication is a veritable short course in forestry and the conservation of natural resources, with special application to the State of California. It is packed with pertinent information valuable to those employed in forest industries, and for those with general interest in the conservation of natural resources in California.

The book, prepared by the State Department of Natural Resources with the cooperation of the State Department of Education, is intended for use as a text at the high school level, primarily for young men terminating their education at the twelfth grade who plan to work in the forests and lumber industries. It is profusely illustrated.

Forestry is simply and well defined as "the management of forests in such a way that they continuously yield the greatest possible benefits." The multiple-use program is explained with reference to water, forage, wildlife, and recreation. The importance of water conservation, in addition to a chapter on this subject, is stressed throughout the book. The structure and growth of trees is explained in clear and simple language, and the forest as a community of interdependent living things—plant and animal—in and with their environment, is emphasized.

Necessity for scientific names for plants is explained, and in general the scientific and common names of trees used in the text correspond with those of the U. S. Forest Serv-

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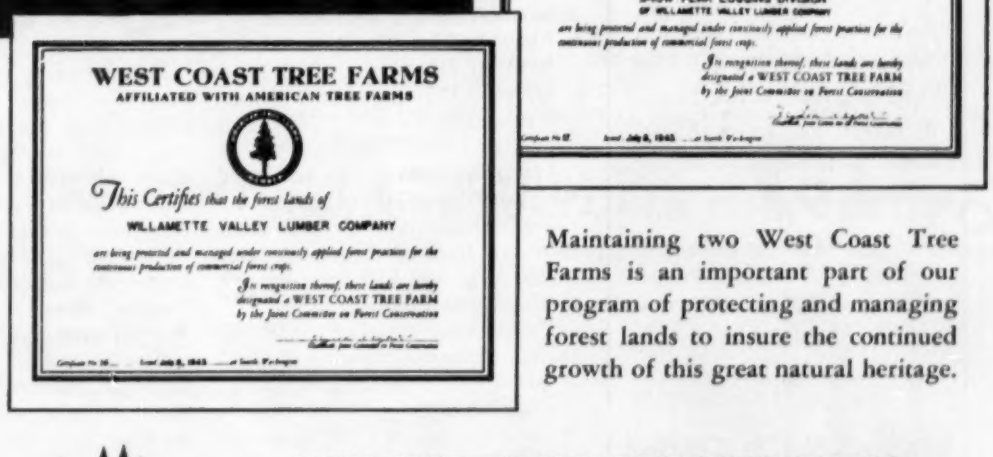
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ice check list. One notable exception is the common name for *Sequoia gigantea*, for which the State Department of Natural Resources has adopted the name of "Sierra redwood." This adds confusion because the U. S. Forest Service and the National Park Service, which administer by far the greater bulk of the *Sequoia gigantea* areas, adhere to the logical Check List common name of giant sequoia.

Under the heading of "National Parks" on page 127 no mention is included of Kings Canyon National Park which contains important groves of giant sequoia, as well as other species of importance.

In the final chapter there is a discussion of forestry as a profession. This, together with the other information in the publication, should aid any young man to decide whether he would be interested in forestry as his career.

This book is a worthy model for other states or organizations contemplating the preparation of similar publications for their respective areas. It is also a publication that should be of value in the library of any forester, whether a resident of California or not.

JOHN D. COFFMAN
*Berkeley, Calif.*

**Education for the Professions**

Lloyd E. Blauch, editor. 317 pp. Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 1955. $1.75 (paper); $2.75 (Buckram).

Lloyd E. Blauck, the editor of this timely publication, is in the Office of Education, U. S. Department of Health, Education, and Welfare, in which federal agency the book was compiled.

Professional training is one of the most important phases of higher education. Over the years preparation for the practice of the professions has grown from somewhat narrow technical, or even vocational, programs to the development of scholarly curriculums with solid foundations in the natural sciences but influenced also by the social sciences and humanities.

That society at large appreciates the services of the professions is evidenced by the great financial support they receive from public funds, from private foundations, and from other sources. The leadership that has gone into the establishment and growth of professional schools is one of the truly significant aspects of American education.

Here, the editor has brought together in one publication the salient facts about professional education in the United States, and devotes a chapter to each of 34 professional fields—from accountancy to veterinary medicine. Forestry is included.

Without the profession, civilized society, as we presently know it, could not be maintained. The role of the professions has been summed up by Chancellor Henry T. Heald of New York University:

"It might, I think, be reasonably said that the thing we call prosperity and the state of mind we refer to as happiness can both be attributed—insofar as we attain them—to the professions: To their growth, to their ever-increasing assumption of responsibility in providing for the needs and wants of the people."

Foresters may take pride in the fact that forestry is numbered among those occupations that are universally recognized as professions. Although it is difficult to define the exact period when forestry became a profession, it probably occurred when foresters accepted the realization that the professional school is the main gateway to forestry as a profession.

Every teacher in forestry can profit by reading this excellent volume. It is a valuable reference work.

HENRY CLEPPER

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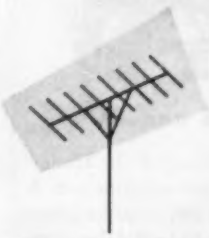

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**Analysis of Soils and Plants for Foresters and Horticulturists**

By S. A. Wilde and G. K. Voigt. 117 pp. Illus. J. W. Edwards, Inc., Ann Arbor, Mich. 1955. $3.75.

One of the problems facing investigators concerned with chemical and physical properties of soil, humus, and plant tissue is the method of analysis to use. This small volume, a pioneer in its field, goes a long way toward solving this problem. The subject matter is broken down into seven sections:

Analysis of physical properties of soils.

Analysis of chemical characteristics of soils.

Analysis of ground water.

Microbiological analysis of soils, humus, and composts.

Floristic and mensurational analyses and native vegetative cover.

Chemical analysis of plant tissue.

Determination of morphological and physiological characteristics of nursery stock.

There are innumerable ways to analyze many of the properties covered in this book and the procedures and references given have been drawn from many sources. For some of the tests, such as the organic matter content of soil, several methods are given. For others, such as the determination of the water permeability of soils, only one of many possible methods is listed. Some of the chemical procedures listed are the so-called quick tests, while others require laboratory skill and equipment. Each new property to be discussed is introduced with a statement as to its importance. Following the description of the determination is a complete list of reagents needed and instructions for preparing them.

Sections pertaining to the various analyses are easily located, and several valuable appendices concerned with chemical analysis of soils, soil fertility and conversion factors are included.

This new volume will be useful to those in forestry and horticulture who are interested in obtaining additional information about some of the factors controlling plant growth. There is more to a plant than meets the eye and a knowledge of what is going on underground can be of great value to all those working with vegetation.

LOUIS J. METZ

**Bibliography of Holly**

By Betty Flanders Thomson. 36 pp. Holly Society of America, Bergner Mansion, Baltimore 16, Md. 1955. 50 cents.

In 1947 the Holly Society of America was organized to promote research and information about the genus Ilex and to develop methods for its culture and preservation. Since that year the Society has issued a series of bulletins of which this is number 8.

A total of 313 articles and books is cited in this bibliography. This

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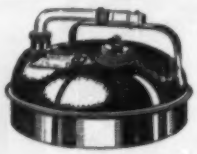

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list probably constitutes the most comprehensive compilation of titles about holly. It includes every substantial scientific paper on the subject that could be found, and in consequence represents a valuable additional to our botanical literature.

Few species have been more widely written about in popular and garden magazines than the Christmas holly, but scientific writings are scarce. This worthy publication at last brings together the available references to research and scientific reports.

❦❦❦

**This is Dinosaur Echo Park Country and its Magic River**

Edited by Wallace Stegner. 97 pp. Illus. Alfred A. Knopf, New York, N. Y. 1955. $5.

At this critical period in the existence of Dinosaur National Monument and perhaps even in the existence of the whole National Park system, this book is most opportune. Though the editor states that the various contributors "have not chosen to make this book into a fighting document," each photograph and each page are as loaded with ammunition as a caisson. All but two of the contributors take well aimed shots at the proposed Echo Park and Split Mountain dams. "Fighting document" it may not be, but it certainly is not a peace treaty with the Bureau of Reclamation or with others who would trade kilowatts for recreation and scenery unique in North America.

One of the most impressive chapters is made up entirely of photographs, 47 in all. Seven of these are full-page color plates which expertly portray the scenic splendor and spirit of the canyons.

Wallace Stegner recounts the early explorations which made known this canyon country and which set the stage for its reservation as a national monument. He

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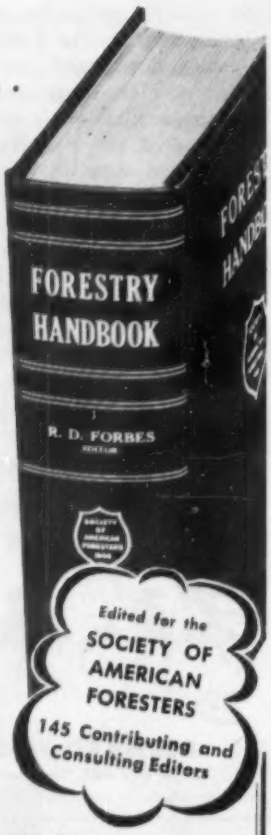


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concludes with an eloquent plea that this area and other wildernesses be preserved from those common trademarks of progress—the signboard, hot dog stand, super highway, and utility line. He believes that the most valuable mark human beings can leave on Dinosaur National Monument "is simply the deliberate and chosen refusal to make any at all."

Prof. Eliot Blackwelder traces the geologic history of Dinosaur country from the Pre-Cambrian area when this region was a slowly sinking plain, up to the present period of the deep, eroding canyons which provide such spectacular scenery. The rather unusual combination of fastwater, which is cutting deep canyons yet has the meandering and serpentine windings that appear in the lower Yampa, is explained.

The most important past and present flora and fauna are listed or briefly described by Olaus Murie and Joseph W. Penfold. Their section "The Natural World of Dinosaur" gets off a few telling shots at the effect of river impoundment on waterfowl habitat, the supposed fisherman's paradise which would be created, and the elimination of the "parks" which provide some of the best winter habitat for big game animals.

The succeeding section of the book is an account of the archaeological findings within the monument. The significance of the pictographs, petroglyphs, and the specimens obtained through excavation is explained by Prof. Robert H. Lister.

Otis Marston's contribution, which tells of the boatmen who succeeded or failed in running the Green and Yampa Rivers, is perhaps the most engrossing section.

A scenic tour overland and by river is conducted by skillful guide David Bradley in a section entitled "A Short Look at Eden." He has done an excellent job of describing the beauty, the color, the peace, and the space of the country he obviously loves so deeply.

The publisher, Alfred A. Knopf, who is chairman of the advisory

(Continued on page 746)

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board of National Parks, Historic Sites, Buildings and Monuments, concludes the book with a well written section setting forth the national park concept. Most of the basic reasons for opposition to the two controversial dams in the Upper Colorado project are ably expounded and a few of the claims of the dam proponents are raked over.

If you have visited Dinosaur Monument; if you plan to visit it; even if you will never visit it, but rejoice in the fact that there is an unspoiled wilderness on the Utah-Colorado border which helps to keep alive the spirit of adventure in America, you will enjoy this book and want a copy for your bookshelf.

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## Publications of Interest

The 1955 edition of the *Policy Declarations on Natural Resources*, Chamber of Commerce of the United States, is now available from that agency, Washington 6, D. C. The 40-page booklet contains precise and clear statements as to the policy positions adopted by the chamber. Two declarations appear in this edition for the first time—dealing with Petroleum (Taxation) and Water Supply. Several other declarations, including portions of the section on Water Resources, were amended and reaffirmed for another three years, while other policies continue in effect without change.

• • •

*Facts About the Nation's Lumber Industry* and *Pulpwood Industry Facts* are two publications (32 pages and 12 pages, respectively) available in their 1955 editions from American Forest Products Industries, Inc., 1816 N St., NW, Washington 6, D. C. Both contain a wealth of statistics in addition to a general picture of industry activities. Both booklets are nontechnical and should prove helpful to writers and educators as well as foresters.

• • •

John D. Coffman, retired chief forester of the National Park Service, has prepared an interesting and attractive bulletin for the Park Service, *Forests and Trees of the National Park System*. Forests are described by types and life zones, indicating in which parks they are to be found. The author points out that "The forests of the National Park System, maintained in their natural state and allowing the natural processes of growth and decay free play, constitute great outdoor museums in which natural relations between plants and animals may be studied." From the Superintendent of Documents, Washington 25, D. C., 15¢.

• • •

*Muskingum Country*, a 26-page booklet published by the Muskingum Conservancy District, New Philadelphia, Ohio, is priced at 35¢ per copy. S. A. F. members may receive free copies. This is a popular type presentation of the methods and achievement of this widely known project to establish coordinated conservation practices on a watershed through the joint efforts of individuals, communities, and various levels of government. An interesting subject, interestingly discussed.

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# Current Literature

*Compiled by* MARTHA MEELIG, *Librarian, State University of New York College of Forestry*

*Range Management Section Compiled by* FRANCES FLICK, *Library, U. S. Department of Agriculture*

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## Accredited Status of Forestry at University of California

In the report of the midyear meeting of the Council, published in the August issue of the JOURNAL, was an item (page 601) captioned "Forestry Re-Accredited at University of California."

Some readers apparently obtained the impression that the University had been re-accredited after a lapse from the Society's accredited list.

For the record it is herewith emphasized that the University has been accredited since the first efforts by the Society in grading schools of forestry in 1935. In short, the University has been on the Society's accredited list from the beginning and has never been off the accredited list.

The re-examination of the forestry curriculum made last January was a routine evaluation carried on by other professional accrediting bodies, as well as by the Society, in cooperation with the Western College Association.


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Thompson field research in the development and application of selective herbicides, the most extensive in America, makes possible far greater and more economical control of undesirable woody species than heretofore.

Whether applied by foliage spray or year 'round basal bark or stump treatment, Thompson's improved, simplified techniques and advanced Broad Spectrum formulations produce unparalleled results.

*Thompson Field Research Station Paper 18 (expanded) providing important data on spray techniques, comparative kills by esters, and cost evaluating criteria is available on request. Our Research Staff will be pleased to answer specific queries without obligation.*

Research Department
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3032 Locust Street, St. Louis 3, Mo.

FIRST NAME IN HERBICIDES

# What would you do with land like this?

**Typical scrub oak** growing on land suitable for southern pine pulpwood. Cut for saw timber years ago, no provision was made for regeneration in slash, loblolly or longleaf pines.

**Ready for planting.** This huge tract in Rayonier's Nassau, Florida, Forest, cleared of scrub oak and palmetto, is now replanted with slash pine seedlings providing useful timber for tomorrow.

## Rayonier's dynamic conservation puts undeveloped land into timber

Thousands of acres of poorly drained land and oak ridges have recently been reclaimed by Rayonier foresters in Georgia and Florida as part of our long-range conservation program.

Now these unproductive tracts are planted to pine for our Southeast chemical cellulose mills. Other areas are brought into timber production as fast as Rayonier foresters can run drainage ditches and remove weed trees and other undesirable vegetation that frequently overtop young pine or compete with larger ones for growing space and nutrition.

Meanwhile in the Pacific Northwest and British Columbia our technical forestry likewise promotes maximum timber growth plus increased growth potentials of the land for future tree crops. Considerable forestry research; advanced protection from fire, disease and insect blight; scientific thinning and harvesting; all bring in larger, healthier crops.

You'll agree that such efforts constitute wise utilization of a prime natural resource, contributing to the dynamic conservation which helps insure abundant timber for the future.

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*cellulose chemistry*

Executive and General Sales Offices: 161 East 42nd St., New York 17

## LITTLE BEAVER TREE GIRDLER

*Cuts labor costs up to 50%*

PRACTICAL — ECONOMICAL—EFFICIENT

Made by: HAYNES MFG. COMPANY
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Available thru: Forestry Suppliers, Inc.

## "BRIGHT SPOT" Tree Marking Paint

*DOUBLE STRENGTH: can dilute with equal amount of kerosene.

*SAVES TIME: mixes easily & quickly: does not clog the gun.

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| 50 gal. or more | 5 GAL. PAILS | $1.55 per gal. |
| Less than 50 gal. | | 1.65 per gal. |
| 52 gal. or more | 1 GAL. PAILS | $1.65 per gal. |
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*WE pay freight up to 10c per gal. on orders of 20 gal. or more.

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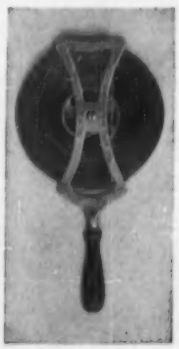

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Everything you need—at your finger tips. Small enough to be carried without trouble—big enough to give adequate first aid. Fits in your pocket. When you need it, you've got it.

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COUNCIL'S
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FIRE RAKES
and SWATTERS

THE COUNCIL TOOL CO.
MAKERS
WANANISH, N. C.

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service, for forestry tools, and equipment we sincerely invite you to give us a c
dedicate ourselves to earnestly strive for perfection in operating a business whic

Our exhibit will be on display at the annual meeting of the SAF in Portla

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**Insect Repellent Bomb.**
**"Tried & True"**
**Repels & kills disease carrying insects, ticks, chiggers, mosquitoes, black flies, & many others. Used by many foresters, loggers, and sportsmen.**

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**Pressure Type Tree Marking Gun**
(1 gal. capacity)

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**Pyramid Backfire Torch**

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**Flame Gun**

**PANAMA PUMP COMPANY**
HATTIESBURG, MISS.
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***PORTABLE***
## FIRE PUMPS

**Uses only clear water. Protect your valuable timber crop.**

**Good for all types of farm fires.**

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Choice of timber cruisers who require a compact instrument with easy-to-read dial. Inner diameter of dial is 2½ inches, graduated to single degrees and marked for both quadrant and azimuth readings. **$12.75**

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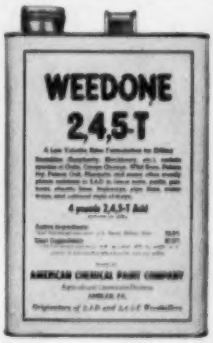


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**Use WEEDONE 2,4,5-T.**

Put every acre to work by killing undesirable trees and let good pine and hardwood grow.

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**Tree Marking Paints**

featuring the exclusive stay-mixed formula #71020 in • ready-mixed • paste and • boundary paint . . .

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r way this year — and to those of you who have never tried our COMPLETE-ONE-STOP
a chance to serve you. Good customer relations is our most valuable asset and we hereby
which you, our customer will believe in and rely upon for your every forestry need.
ortland, Oregon and I will personally be on hand to talk to anyone interested in our service.
ing us your order today. We are as close as your nearest mail box or telephone.

See you in Portland, BEN C. MEADOWS, *President and Manager*

*IN VALUES CONTACT*

# UPPLIERS INC.

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# Society Affairs

## Officers and Council
### 1954-1955

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Washington 6, D. C.

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State University of New York
College of Forestry
Syracuse 10, N. Y.

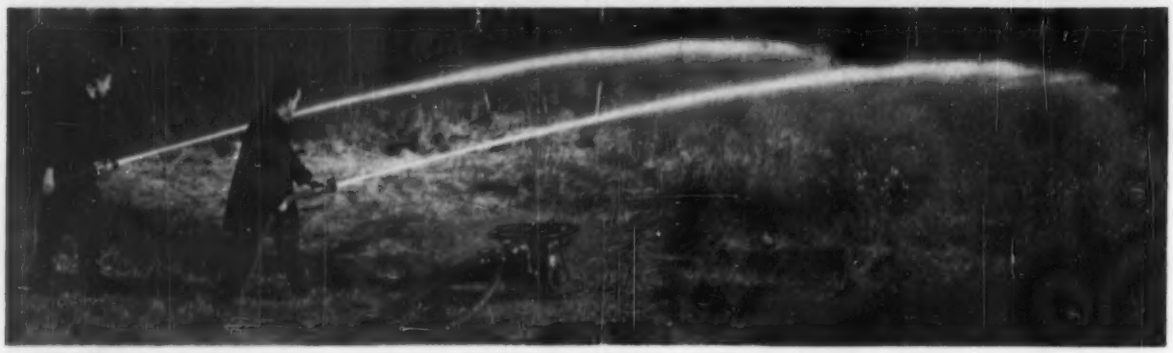
J. HERBERT STONE
U. S. Forest Service
729 N.E. Oregon St.
Portland 8, Ore.

RUTHFORD H. WESTVELD
Department of Forestry
University of Missouri
Columbia, Mo.

EDITOR'S NOTE.—This issue of the JOURNAL marks the month of the Society's Annual Meeting, its 55th. It is also unique in that it carries a greater volume of paid advertising material than any issue in its history. On behalf of the profession we wish to express our appreciation to its many friends who have taken space to extend greetings and best wishes to the Society of American Foresters or to advise our readers of the source of useful products and services. To old acquaintances in our pages and to new friends we in turn extend our thanks.


American-Marsh 3XD CENTRIFUGAL Forester's Fire Pump

DELIVERS TWO POTENT STREAMS



Easily mounted on truck

or carried to fire

Want a pump that quenches burning brush and trees with *two* healthy streams? Want portability, ruggedness *and* 4-cycle dependability?

Then the 3XD is *your* pump! Capacity enough to supply two 1½" hose lines with ½" nozzles. Pressure to throw stream over farm or small town buildings. Quick-starting, self-priming on lifts to 20', the 3XD handles clean or dirty water. Get full details . . .

*WRITE for 3XD Pump Bulletin 8120! For single stream pump, write for XF Bulletin 8122.*

*Pumps and Pumps Only Since 1873*

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CANADIAN PLANT:

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# COMPARE ABILITY . . . COMPARE COST! CHOOSE THE BD-3 MOTOR GRADER

**Outstanding Performance On All Types of Jobs.** The Allis-Chalmers BD-3 is a *quality* motor grader — with such features as tandem drive for maximum traction; exclusive ROLL-AWAY moldboard that efficiently rolls the load instead of pushing it; high axle and throat clearance to clear large windrows; husky tubular steel frame that absorbs stresses and strains. In addition, the BD-3 has the right combination of weight, power and traction to do outstanding work on a wide variety of motor grader jobs.

**Economical to Own and Operate.** The BD-3's economy begins with its purchase price. You are invited to compare this with the cost of other graders in its class. Compare also what you get for your money. The modern engineering, quality materials and precision workmanship in the BD-3 are your assurance of long-life dependability.

For the complete BD-3 story see your Allis-Chalmers Construction Machinery Dealer.

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78 brake hp— 19,220 lb • 6 forward speeds to 18.5 mph 3 reverse speeds to 6.3 mph

ROLL-AWAY is an Allis-Chalmers trademark

ALLIS-CHALMERS

## S.A.F. Members Invited to Pacific Logging Congress

All members attending the Society's annual meeting are invited to attend also the Pacific Logging Congress in Victoria, B.C ., October 12-14. Hotel reservations may be obtained through Carwin A. Woolley, 1222 American Bank Building, Portland 5, Ore., secretary of the congress.

## Deadline for Consultants Listing

Consulting foresters who wish to have their names included in the directory of Consulting Foresters, to be published in the January 1956 JOURNAL OF FORESTRY, should apply to the Society office not later than November 1, 1955. Information supplied should follow the form used in the directory published in the January 1955 JOURNAL.

Consultants whose listings appeared in the previous directory and who have not returned inquiry cards mailed in September, should do so at once.

# Annual Meeting

## Society of American Foresters

## Portland, Ore., October 16-19, 1955

### *Theme: "Converting the Old Growth Forest"*

**Schedule of Events**

Members, their ladies, and guests who plan to attend the meeting are urgently requested to arrive in Portland on Sunday, October 16, or not later than the morning of Monday, October 17. The opening general session starts on Monday morning.

As will be seen from the following schedule of events, numerous meetings and technical sessions have been arranged to provide attractions for a diversity of interests.

**Sunday, October 16**

S.A.F. Council meeting: morning and afternoon.

Committee on Advancement of Forestry Education: afternoon.

Field Trip to Portland City Forest and Gallery of Trees: afternoon.

Editorial Board, JOURNAL OF FORESTRY: evening.

Joint meeting of Council and Section delegates: evening.

Association of Consulting Foresters: evening.

Xi Sigma Pi: evening.

**Monday, October 17**

Opening General Session: morning.

Society Affairs Session: afternoon.

Ladies Field Trip to Mt. Hood: morning and afternoon.

Division of Education: evening.

Division of Private Forestry: evening.

Division of Range Management: evening.

Committee on Forest Tree Improvement: evening.

**Tuesday, October 18**

Division of Silviculture: morning and afternoon.

(Continued on page 758)


# UPWARD AND FORWARD

Ever since our company pioneered in the manufacture of wood pulp in the Pacific Northwest years ago, it has set progressively higher and more advanced goals for itself—and then set out to overtake and pass them.

From very humble beginnings, our plant has grown, in successive stages, to be one of the West's largest and best equipped. The quality of its pulp is kept to a world renowned high standard for bleached sulphite.

Our utilization has advanced, too, over the years, to include: pulping of minor species; salvage logging clean-up in the woods; hydraulic barking at the mill; and, since 1945, recovery of alcohol and other useful products from pulp liquor wastes.

The timberlands which we have acquired, for their wood-producing potential, are under the management of professionally trained foresters; they are lands dedicated to continuous, high level production of wood, to be harvested according to the best utilization standards.

## PUGET SOUND PULP AND TIMBER CO.

***Bellingham, Washington, U. S. A.***

# "Double" your road width with 2-way Radio!

Hauling operations on one-lane roads can be made more practical by controlling truck movements with Motorola two-way radio. Turnouts are controlled with minimum lost time when radio in the log trucks keeps drivers informed of truck movements.

Two-way radio minimizes accidents, reduces road construction costs, rushes assistance in emergencies, and increases the efficiency of capital equipment. It sums up this way—more logs at less cost. Appreciable savings are quickly realized. Favoring two-way radio, the National Forest Industries Communications Association states: "the difference between operating with or without two-way radio is the difference between operating at a profit or a loss for many logging operations."

If you operate in Forest Service timber, two-way radio gives you instantaneous communications for forest protection and fire control as required by the U. S. Forest Service.

Motorola, *the complete* communications supplier, will furnish the equipment you need on the terms *you* want — cash purchase, installment plan, lease with or without equity, and optional installation and maintenance all included in a single contract.

Find out how you can make greater profits in 1955 with the equipment that often pays for itself in less than a year. **WRITE TODAY**

**Motorola**
**2-WAY RADIO**

Motorola Communications & Electronics, Inc.
A SUBSIDIARY OF MOTOROLA, INC.
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*Motorola consistently supplies more mobile radio than all others combined—*
*proof of acceptance, experience and quality.*
*The only COMPLETE radio communications service — specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance.*
*"The best costs you less — specify Motorola".*

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***of CALIFORNIA***
Since 1952
R. S. ADAMS A. P. EAAL
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DAVIS ——— CALIFORNIA

**SILVA COMPASS**
**Simpler — More Accurate**
Recommended by foresters for cruising. Easier to use, faster, positive. Direct course readings. *Write for free literature and instructions.*
SILVA, INC., Dept. J, LaPorte, Ind.
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**SWEDISH HUNTING KNIVES**
**Imported of finest Swedish steel priced at $4.50 for 4⅛" blade, and $6.00 and $6.50; then $8.50 for 6", and $10.50 for 5¾" with fancy moose head handle and sheath. Write for information or send check or money order for size desired.**
***Satisfaction, or money back guarantee.***
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**FIRE PROTECTION TOWERS**
**OF GREAT STRENGTH AND DURABILITY**

Permanent and substantial structures to provide shelter and security for the observer and his instruments. Capable of resisting fire, storm, and high wind. Steel parts hot process galvanized after fabricating. Standard equipment in many states.

**EASY TO ERECT**

Towers are assembled by building up from foundations a piece at a time. All connections are secured with galvanized bolts furnished by us.

Towers are shipped knocked down in pieces and bundled in convenient sizes to transport and handle.

Write for specific information on towers to meet your needs.

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CHICAGO 8, ILL.

Division of Forest Recreation: morning.

Division of Public Relations: morning.

Ladies Style Show and Brunch: morning.

Division of Forest Products: afternoon.

Division of Forest-Wildlife Management: afternoon.

Fruits-of-the-Land Barbuecue and social evening.

J. HERBERT STONE, general chairman of the Society's 55th annual meeting.

**Wednesday, October 19**

Division of Forest Management: morning and afternoon.

Division of Forest Economics and Policy: morning.

Ladies Forestry Forum: morning.

Division of Watershed Management: afternoon.

The annual Society Dinner: evening.

**Thursday, October 20**

Industrial Tree Farm Field Trip: all day.

Tillamook Burn Field Trip: all day.

**Friday, October 21**

Mt. Hood National Forest Field Trip: all day.

Forest Industries Field Trip: all day.

### General Meeting

**Monday, October 17**

Henry Schmitz, Chairman

**Morning Session**

**Theme: "Converting the Old Growth Forest."**

**MEDFORD CORPORATION**
**Medford, Oregon**

MEDCO

**MANUFACTURERS**

**PONDEROSA PINE**
**DOUGLAS FIR**
**SUGAR PINE**
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**INCENSE CEDAR**

18 Dry Kilns

Member
W.C.L.A.-W.P.A.

Annual Production
70,000,000 Ft.

1. Introduction by Chairman Schmitz.

2. Welcome by Governor Paul Patterson of Oregon.

3. "Preserving the Public's Interest in Converting the Old Forest to New." Arthur W. Greeley, U. S. Forest Service, Juneau, Alaska.

4. "Managing the Forest in the Conversion Process, with Particular Reference to Road Development." E. P. Stamm, Crown Zellerbach Corporation, Portland, Ore.

5. "Protecting the Resource in Converting the Old Forest to New." DeWitt Nelson, Department of Natural Resources, Sacramento, Calif.

### Society Affairs

**Monday, October 17**

E. L. Demmon, President
DeWitt Nelson, Vice President

**Afternoon Session**

1. "The Timber Resource Review." Richard E. McArdle, U. S. Forest Service, Washington, D. C.

2. Report of the President, E. L. Demmon.

3. Report of the Executive Secretary, Henry Clepper.

4. Report of the Editor, Arthur B. Meyer.

5. Committee Reports.
Open forum discussion.

### Division of Education

**Monday, October 17**

Archie E. Patterson, Chairman
W. F. McCulloch, Vice Chairman
David M. Smith, Secretary

**Evening Session**

1. "A Program of Summer Employment for Pre-forestry High School Graduates." Walter H. Schaeffer, College of Forestry, University of Washington, Seattle, Wash.

2. "Earned Doctor Degrees in Forestry." Joseph S. Illick, College of Forestry, State University of New York, Syracuse, N. Y.

3. "Limiting Enrollments in the Schools of Forestry." Glen R. Durrell, Department of Forestry, Oklahoma A & M College, Stillwater, Okla.

4. "Handling Large Enrollments Without Lowering Standards of Instruction." James D. Snodgrass, School of Forestry, Oregon State College, Corvallis, Ore.
Discussion.

5. "The Case for the Generalized Curriculum in Forestry." George B. Hartman, Department of Forestry, Iowa State College, Ames, Iowa.

6. "The Case for the Regionalized Curriculum in Forestry." Gordon D. Marckworth, College of Forestry, University of Washington, Seattle, Wash.
Discussion.

### Division of Range Management

**Monday, October 17**

Charles E. Poulton, Chairman
Bert H. Tucker, Vice Chairman
Elbert H. Reid, Secretary

**Evening Session**

Panel Discussion: "Site Classification as We Convert Old Forest Ranges to New."

1. Remarks by Division chairman.

2. "Principles in the Use of Vegetation to Indicate Grazing Potentials of Forest Land." Rexford Daubenmire, Department of Botany, State College of Washington, Pullman, Wash.

3. "Soil-Vegetation Surveys as an Aid in Range Management." Robert A. Gardner, California Forest and Range Experiment Station, Berkeley, Calif.

4. "Site Classification as a Basis for Game Range Management." Fred W. Johnson, U. S. Forest Service,

(Continued on page 761)


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Sound Forest Management for over fifty-five years, resulting in a continued increase in forest inventories throughout the extensive holdings of the Great Northern Paper Company, has helped make possible the current expansion program utilizing hardwood trees as well as softwood in the manufacturing of newsprint.

Sixteen foresters patrol Great Northern's timberlands, along with many other trained personnel to guarantee the protection, conservation and proper utilization of forest growth. An adequate supply of wood is assured as natural regeneration provides for repeated pulpwood crops and new wilderness territory is made accessible by private development.

The Great Northern Paper Company knows that a continuous forest yield is necessary to its prosperity, and their timberlands are managed to assume that goal.

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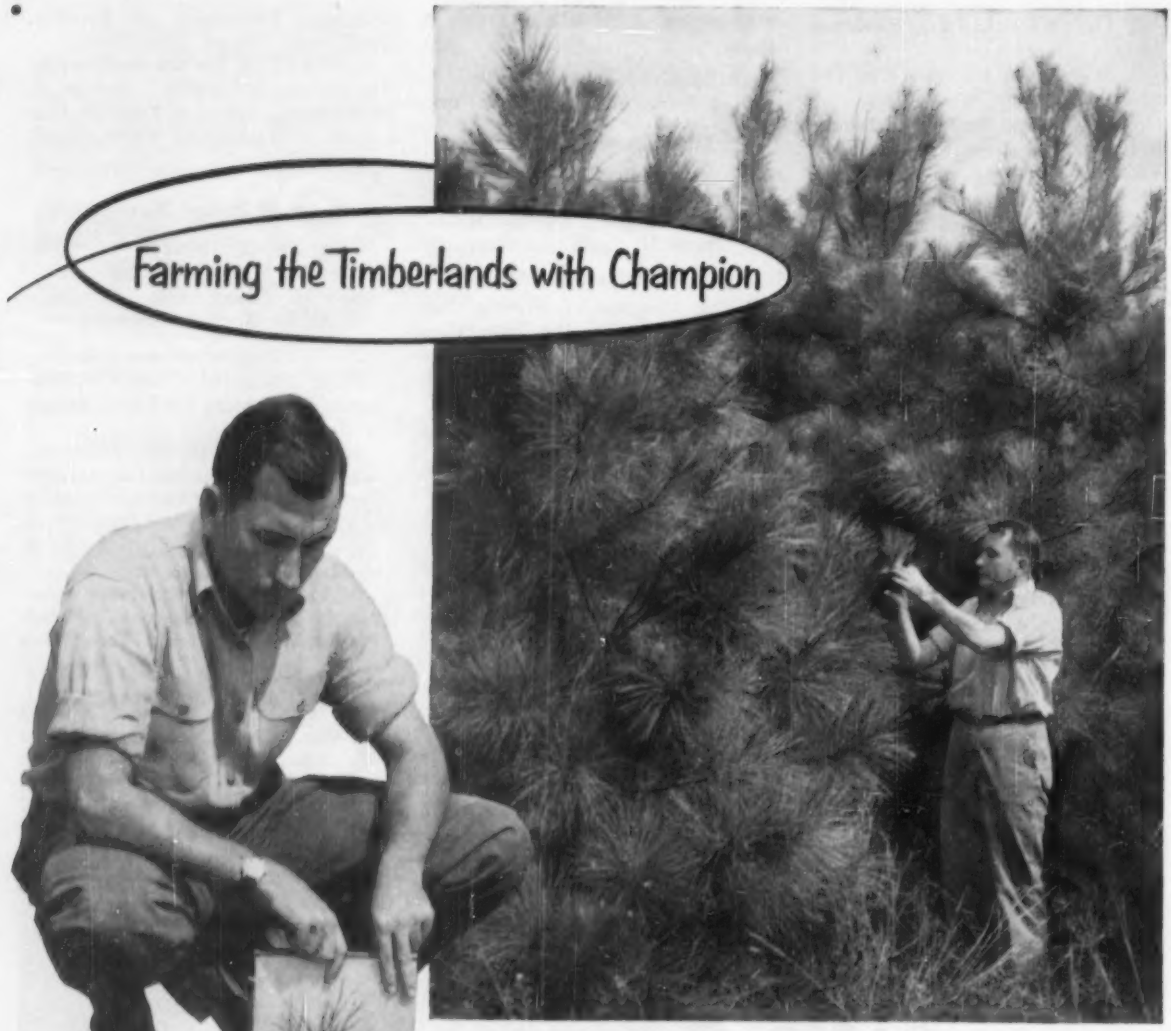


## Paper by Champion
## Starts with Good Forest Management

Good forest management is a major contribution to the progress and pleasure of mankind. Champion salutes the forestry profession upon which it depends for the development and protection of our nation's forests.

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Missoula, Mont.

5. "Site Classification as a Basis for the Improved Design and Interpretation of Research." David F. Costello, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

6. "Range Management on a Scientific Basis as We Convert from Old Ranges to New." Gerald D. Pickford, U. S. Forest Service, Steamboat Springs, Colo.

### Division of Private Forestry

**Monday, October 17**

W. D. Hagenstein, Chairman
Arthur W. Nelson, Jr., Vice Chairman
Clarence Richen, Secretary

**Evening Session**

1. "Are We Making Progress Fast Enough?"

2. "Private Forestry Employment."

3. "Should the Division of Private Forestry be Continued?"

### Division of Silviculture

**Tuesday, October 18**

John W. Duffield, Chairman
Carl Ostrom, Vice Chairman
George R. Staebler, Secretary

**Morning Session**

1. "Forest Succession Following Fires in the Interior of Alaska." Harold J. Lutz, School of Forestry, Yale University, New Haven, Conn.

2. "Replacing the Slow-growing Climax Forests of Southeast Alaska with Second-growth." H. E. Andersen, Alaska Forest Research Center, Juneau, Alaska.

3. "Silvical Factors Influencing Resistance of Ponderosa Pine to Bark Beetle Attack." E. W. Mogren, School of Forestry and Range Management, Colorado A & M College, Fort Collins, Colo.

4. "The Silvicultural Importance of the Sitka Spruce Weevil in Coastal Oregon and Washington." K. H. Wright, Pacific Northwest Forest and Range Experiment Station, Portland, Ore., and Donald Baisinger, Crown Zellerbach Corporation, Portland, Ore.

5. "Effect of Ripeness on the Viability of Sugar, Jeffrey, and Ponderosa Pine Seeds." Gilbert H. Schubert, California Forest and Range Experiment Station, Berkeley, Calif.

6. "Where Are We in Natural Regeneration Research in the Douglas-fir Region?" Leo A. Isaac, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

(Continued on page 764)

**Rootspred**
**Tree Planters**

3 models

**Standard**

For heavy, stony soils, steep hillsides. Heeling wheels adjustable to line up with tree row on hillsides. Widely used by northeastern Christmas tree growers.

**Lake States**

Same features as "Standard" but has scalping middlebuster between coulter and trencher.

**M-4**

Extra heavy construction with 28" coulter. For partly cleared or cutover land. Plants on short curves where stumps, roots, brush are problems.

These are heavy-duty machines for Ford, Ferguson, Case, International Super C., etc.

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**St. Petersburg, Penna.**

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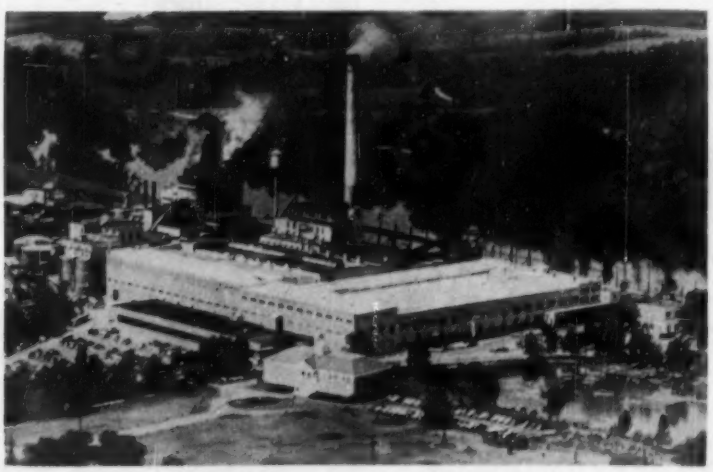
To help develop and further the interests of all private timberland owners in order that the forest industry may become a proficient, private enterprise which will make the growing of trees an "around-the-year" profitable business.



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and Its Sales Division

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Here's your chance to get a wonderful buy on the leading chain saw. Get ready for Fall and Winter cutting with a powerful, labor-saving McCulloch saw exactly suited to your needs.

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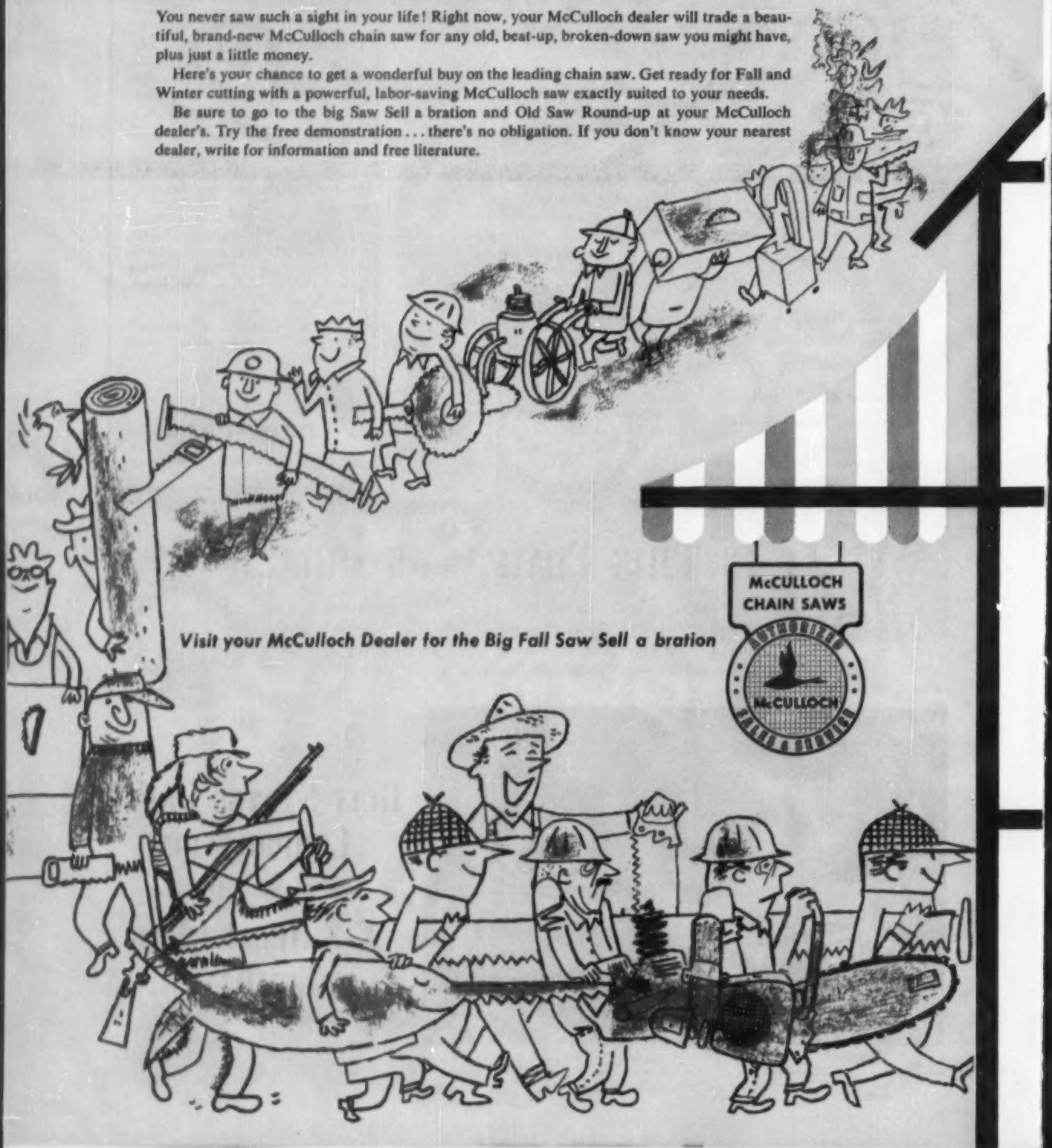


*Visit your McCulloch Dealer for the Big Fall Saw Sell a bration*

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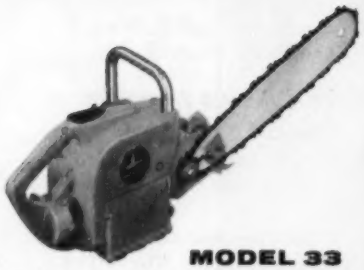

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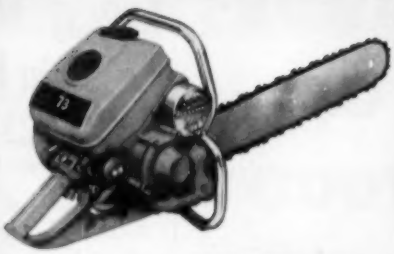
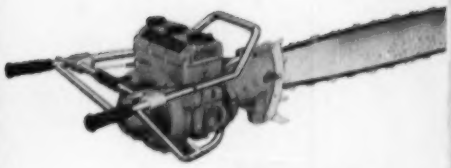


**MODEL 73**

Fastest-cutting 1-man saw; top professional favorite; weighs 31 lb. $365 up.



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The two-man production saw for extra-heavy duty. Blades to 60 in. $450 up.

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Cut with the tip, save labor in pulp logging. Bow saws are available in all models, $249 up.

***McCulloch Saws Cut Fastest! You can make this cutting test yourself.***

Use a McCulloch demonstrator saw to make a cut through a log of the size and type you'd normally be cutting. Check how long the cut takes.

Then make a similar cut through the same size and type of log with any other make of saw in the same range of weight or price, and check the time.

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**Afternoon Session**

Panel Discussion: "Forest Soils."
Moderator: Stanley P. Gessel.

1. "Forest Soils of the Pacific Northwest." Robert F. Tarrant, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

2. "Effect of Tractor Logging on Soils and Regeneration in the Douglas-fir Region of Southwest Washington." Eugene C. Steinbrenner, Weyerhaeuser Timber Company, Centralia, Wash., and Stanley P. Gessel, College of Forestry, University of Washington, Seattle, Wash.

3. "Soils in Relation to Site Index Curves." Stephen H. Spurr, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

4. "Forest Tree Nutrition and Forest Fertilization." T. N. Stoate, MacMillan & Bloedel, Ltd., Nanaimo, B. C., Canada, and Richard B. Walker, Department of Botany, University of Washington, Seattle, Wash.

5. "Soils Information for the Use of the Practicing Forester." Warren Starr, Department of Soils, Washington State College, Pullman, Wash.

Discussion.

6. Business meeting.

## Division of Public Relations

**Tuesday, October 18**

Ralph G. Unger, Chairman
A. K. Wiesendanger, Vice Chairman
C. W. Mattison, Secretary

**Morning Session**

Panel Discussion: "Public Aspects of Old-Growth Cutting on Multiple Uses of a Forest Community."

1. "Park Preservation." David R. Brower, Sierra Club, San Francisco, Calif., and Mrs. T. Wetherford, General Federation of Women's Clubs, Arlington, Ore.

2. "Roadside and Scenic Strip Preservation."

3. Summary. Marshall T. Dana, U. S. National Bank, Portland, Ore.

## Division of Forest Recreation

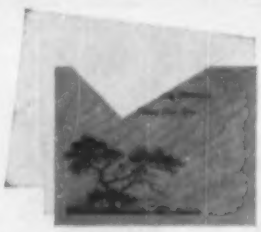
**Tuesday, October 18**

William N. Parke, Chairman
Donald P. Duncan, Vice Chairman
James P. Gilligan, Secretary

**Morning Session**

1. "Conversion of the Virgin Forests in Parks." Newton B. Drury, De-

(Continued on page 766)



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Prepared by Frank H. Kaufert, Project Director, and William H. Cummings, Project Forester, for the Society of American Foresters Forestry Research Project.

Financed by a grant from the Rockefeller Foundation, the study was made under the general supervision of a steering committee of the Society of American Foresters and the National Research Council. *Forestry and Related Research in North America* is the result of a reappraisal of the existing structure of forestry and related research programs in North America, and includes recommendations and goals for the next quarter-century.

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Merlin the Magician saw no more wonderful sights in his crystal ball than Simpson Forester Oscar Levin admires through his magnifier. Counting the seeds in a cluster of Douglas fir cones is an adventure in counting trees to come.

Simpson lands are kept busy from tree crop to tree crop. This begins with the seed cone, followed by the threshing, the nursery start, the transplanting on forest lands, the years of protection from fire, animals and disease and then the harvest.

Whoever saw more wonders than a tree farmer as he spreads apart a cone to count the crop of the future?

## SIMPSON LOGGING COMPANY

**Shelton and McCleary, Washington**

partment of Natural Resources, Sacramento, Calif.

2. "The Value of Forest Recreation at the State Level." John Vanderzicht, Washington State Parks and Recreation Commission, Seattle, Wash.

3. "Searching for the End of the Rainbow." G. E. Cannon, Standard Insurance Company, Portland, Ore.

4. "Managing Timber Stands for Recreation." John Sieker, U. S. Forest Service, Washington, D. C.

### Division of Forest Products

**Tuesday, October 18**

Lincoln A. Mueller, Chairman
Russell Stadelman, Vice Chairman
Stephen B. Preston, Secretary

**Afternoon Session**

Panel Discussion: "Utilization of Wood Residue for Hardboard."

1. Coreboard and Pulp." Ralph Chapman, Corvallis, Ore.

2. "Improving Veneer, Plywood, and Lumber with Paper Overlays." Robert Seidl, U. S. Forest Products Laboratory, Madison, Wis.

3. "Wyssen Skyline Logging." E. E. Matson, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

4. "Growth and Use of Laminated Wood Structure." Ward Mayer, Timber Structures, Inc., Portland, Ore.

5. "Pulping Hardwoods."

### Division of Forest-Wildlife Management

**Tuesday, October 18**

Ralph T. King, Chairman
Avon Denham, Vice Chairman
C. Frank Brockman, Secretary

**Afternoon Session**

Panel Discussion: "The Effect of Logging Old-Growth Timber on Wildlife." Discussion Leader: Frank R. Butler, British Columbia Game Commission, Vancouver, B. C., Canada.

1. "The Effects of Logging Old-Growth Timber on Fish Management." Philip W. Schneider, Oregon State Game Commission, Salem, Ore.

2. "The Effects of Logging Old-Growth Timber on Big Game." Eric Huestis, Department of Lands and Forests, Edmonton, Alta., Canada.

3. "The Effects of Logging Old-Growth Timber on Rodent Control." Donald Spencer, U. S. Fish and Wildlife Service, Denver, Colo.

4. "The Effects of Logging Old-Growth Timber on Bear." J. Burton Lauckhart, Washington State Game Department, Seattle, Wash.

5. "The Effects of Wildlife on Timber Reproduction Following Logging of Old-Growth Timber." Casey E. Westell, Jr., American Box Board Company, Filer City, Mich.

6. "The Effects of Logging Old-Growth Timber on Sportsman-Landowner Relationships." Kramer Adams, Weyerhaeuser Timber Company, Tacoma, Wash.

Discussion.

### Division of Forest Management

**Wednesday, October 19**

Myron B. Savage, Chairman
J. Walter Myers, Vice Chairman
Laurence K. Mays, Secretary

**Morning Session**
**Management**

1. "Is Forest Management a Part of Forest Economics — Or What Is It?" Kenneth P. Davis, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

2. "The Practical Use of Management Plans in Initiating Sustained Yield Forestry." Wally G. Hughes,

(Continued on page 768)

The efficient use of our forest resources and the protection and care of these priceless assets are top objectives of Marathon management. Scientific forestry techniques are promoted and practiced on millions of acres of company-owned and company-leased woodlands in the United States and Canada.

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CHRISTOPHER RICHARD PETTERSEN is two and a half years old. His father works for St. Paul & Tacoma Lumber Company.

Chris should be joining the firm in about 1972—after he graduates from Forestry School, like his Dad before him.

It will take a good bit longer before the young Douglas fir comes of age, but we're counting on it, nonetheless.

At the 200,000-acre Tree Life Tree Farm, near Mount Rainier, this whole generation of trees will be logged in about 80 years.

By that time, Chris's grandson should be with us to help log, process or market the benefits of this generation-to-generation planning. If he is, we're sure he, too, will help perpetuate his forest products inheritance through tree farming—thereby insuring future timber harvests for still future products and payrolls.

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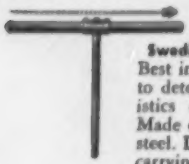

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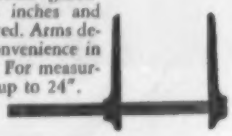

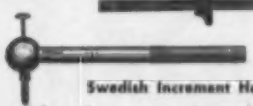

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For quick and easy examination of the bark and the last few year rings of a tree. When swung as a hammer, the hole pipe enters the bark at a right angle. When hammer is removed from the tree, a bark and wood sample is ejected by a plunger.

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British Columbia Forest Service, Victoria, B. C., Canada.

3. "Converting Our Old-Growth Forests." Royce Cornelius, Weyerhaeuser Timber Company, Tacoma, Wash.

Discussion.

4. "Business Implications of Automation and the Need for Forest Management." James G. Rowbury, Scott Paper Company, Everett, Wash.

5. "Some Uses of Aerial Photos in the Management of Wild Land Areas." Robert N. Colwell, University of California, Berkeley, Calif.

**Mensuration and Inventory**

1. "Growth Inventory: A Valuable Part of Complete Forest Inventory." Earle R. Wilcox, Klamath Indian Agency, Ore.

2. "A Forest Growth Study." Paul Casamajor, Broadview Research and Development, Burlingame, Calif.

Discussion.

**Afternoon Session**
**Forest Protection**

**Fire**

1. "Old-Growth Conversion Also Converts Fireclimate." Clive M. Countryman, California Forest and Range Experiment Station, Berkeley, Calif.

2. "Protection of Old-Growth Douglas-fir Forests from Fire." Fred J. Sandoz, The Booth-Kelly Lumber Company, Springfield, Ore.

3. "Fire Control on Public Domain Lands in Alaska." Eugene V. Zumwalt, Bureau of Land Management, Anchorage, Alaska.

4. "Synopsis of Salvage Operations—Forks Fire of 1951." Mason B. Bruce, Olympic National Forest, Olympia, Wash.

Discussion.

**Insects and Disease**

1. "Cooperation Speeds Salvage of Windthrown and Beetle-Killed Timber in Oregon and Washington." W. D. Hagenstein, Industrial Forestry Association, Portland, Ore., and R. L. Furniss, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

2. "Color Photographs Useful in Evaluating Mortality of Douglas-fir." J. F. Wear, Pacific Northwest Forest and Range Experiment, Portland, Ore.

3. "Effects of Black-Headed Budworm Feeding on Second-Growth Western Hemlock and Sitka Spruce." William McCambridge, U. S. Forest Service, Juneau, Alaska.

(Continued on page 770)


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*Welcomes 1956 SAF Meeting*

Nickey Brothers, Inc., producers of "None-Better" hardwood products since 1866, takes this opportunity to welcome the members of the Society of American Foresters to attend the 1956 Annual Meeting at Memphis, Tennessee.

We are managing the hardwoods on our own lands, and also the tree farms of the NICKEY TREE FARM FAMILY.

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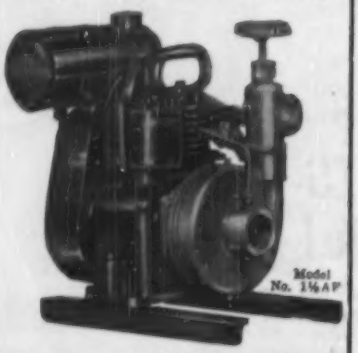


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4. Business Meeting.

### Division of Forest Economics and Policy

**Wednesday, October 19**

Henry J. Vaux, Chairman
M. B. Dickerman, Vice Chairman
A. C. Worrell, Secretary

**Morning Session**

1. "Forest Resources in the Pacific Coast Economy." H. R. Josephson, U. S. Forest Service, Washington, D. C.

2. "Economic Effects of Integrated Utilization on Pacific Coast Forest Management."

a. "Recent Developments and Current Effects." Charles E. Young, Weyerhaeuser Timber Company, Tacoma, Wash.

b. "Integrated Utilization in British Columbia." Thomas G. Wright, Canadian Forest Products, Ltd., Vancouver, B. C., Canada.

c. "Implications for Future Development." John A. Zivnuska, School of Forestry, University of California, Berkeley, Calif.

3. "The Role of Public Forests in Economic Development of the Pacific Coast Region." G. Burton Wood, Department of Agricultural Economics, Oregon State College, Corvallis, Ore.

Comments. Edward P. Cliff, U. S. Forest Service, Washington, D. C. and Loran L. Stewart, Bohemia Lumber Company, Cottage Grove, Ore.

4. Business Meeting.

### Division of Watershed Management

**Wednesday, October 19**

A. R. Croft, Chairman
E. A. Colman, Vice Chairman
W. E. Bullard, Secretary

**Afternoon Session**

1. Business Meeting.

2. "A Watershed Research Program for the Northwest." E. G. Dunford, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

3. "Measurement and Management of Watershed Snow Packs." R. A. Work, Soil Conservation Service, Portland, Ore.

Discussion.

4. "Water Quality and Forest Management." C. M. Everts, Jr., Oregon State Board of Health, Portland, Ore.

Discussion.

5. Panel Discussion: "Minimizing Watershed Disturbance from Logging Operations."

(Continued on page 772)

**SUCCESSFUL TREE FARMS ARE ESSENTIAL**

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Participants: D. E. Colwell, Cascade Lumber Company, Yakima, Wash.

Lester Monerief, U. S. Forest Service, Ogden, Utah.

P. E. Packer, Intermountain Forest and Range Experiment Station, Missoula, Mont.

D. R. Hopkins, State Division of Forestry, Olympia, Wash.

E. A. Johnson, Coweeta Hydrologic Laboratory, Dillard, Ga.

Discussion.

### Social Evening

**Tuesday, October 18**

The Columbia River and Puget Sound Sections have arranged a fruits-of-the-land barbecue in Oaks Park at 6 p.m. Featured on the menu will be chinook salmon, buffalo, Tillamook cheese, and other delicacies of the Northwest.

The cost per person will be $1.50. Transportation will be provided.

### Society Dinner

**Wednesday, October 19**

Robert W. Cowlin, Toastmaster

Address. Bernard L. Orell, Weyerhaeuser Sales Company, St. Paul, Minn.

Entertainment.

A social hour, to which members, their ladies, and guests are cordially invited, will precede the dinner through the courtesy of the equipment companies.

### Field Trips

Five field trips have been arranged to show the highlights of city, state, federal, and industrial forest management in the Pacific Northwest.

Those attending the meeting are requested to make tentative, advanced reservations for these trips, especially for the trip on Sunday afternoon, October 16. The hotel reservation form on page 781 may be used.

Tickets for each trip will be put on sale during the meeting. The indicated cost for each trip is approximate.

Ladies are welcome on all field trips except the tour to the Tillamook Burn on Thursday, October 21.

**Sunday, October 16**

**Portland City Forest.**—This is a

(Continued on page 774)

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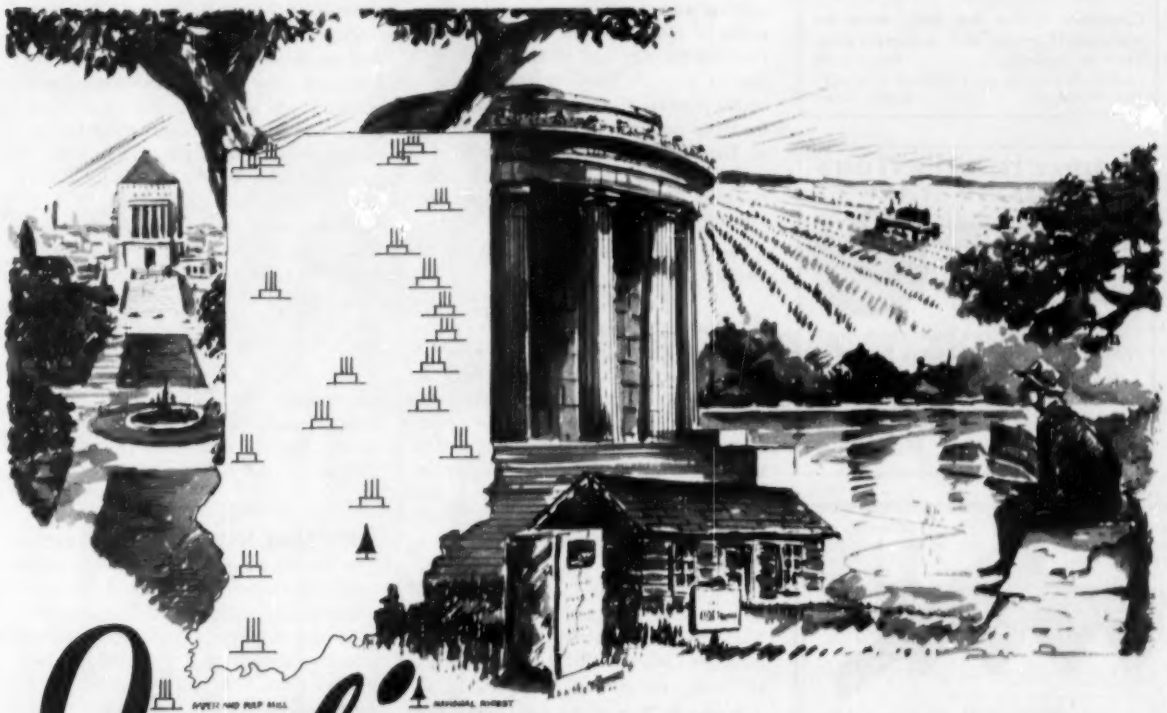

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Of its four million acres of forest lands, 150,000 are in state forests, parks, game and wildlife lands. 200,000 acres of private lands, including thousands of farm woodlots have been set aside for such purposes. And an additional 115,000 acres is encompassed by the Itosier National Forest.

In addition to their industrial value, these forest acres endow the state with scenic and recreational attractions from the dunes of Lake Michigan on the north, through a land of hundreds of natural lakes, prosperous cities and farms, to the picturesque bluffs on the Ohio River on the south.

Indiana, the Crossroads of America, is rich in natural resources. Good soil and favorable climate are responsible for a strong agricultural as well as forest growth. Abundant wildlife, and noteworthy deposits of oil and gas, coal, clay, gypsum, limestone,—all contribute to the state's economy.

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5,200-acre forest within the City of Portland under the management of a resident forester. The trip will include visits to Hoyt Arboretum; panoramic views of the city and of Mt. Hood; and the Gallery of Trees housed in Portland's famous Forestry Building which contains remarkable historical exhibits of forestry and logging. A reception will be held in the Gallery of Trees from 2 p.m. to 5 p.m. Complimentary refreshments will be served.

Cost of the tour, $1. Ladies are invited.

**Thursday, October 20**

**Industrial Tree Farm Tour.**—Tree Farms in the Columbia River area between Portland and Astoria will be visited, and particularly the Columbia and Clatsop Tree Farms of the Crown Zellerbach Corporation. There will be an opportunity to see thinning operations of young Douglas-fir stands and logging methods. Logging of old-growth hemlock-spruce forests along the Pacific Ocean will show the modern, highly flexible logging equipment now commonly used in the Pacific Northwest. Plantations, fire protection measures, woods utilization, and growth of young stands will be seen.

Time: 8:30 a.m. to 8:30 p.m. Cost per person, $3 (including luncheon and dinner). Ladies are invited. Clothing should include rainwear, heavy shoes, and warm jackets.

**Tillamook Burn Tour.**—This tour will show work by the Oregon State Forestry Department to rehabilitate state-owned lands in the Tillamook Burn—an area of about 300,000 acres in Northwest Oregon that was burned three successive times by the disastrous fires of 1933, 1939, and 1945. This is probably the world's largest forest rehabilitation project. The Burn is being fireproofed by salvage logging, snag falling, and road building; reforestation is by planting and aerial seeding.

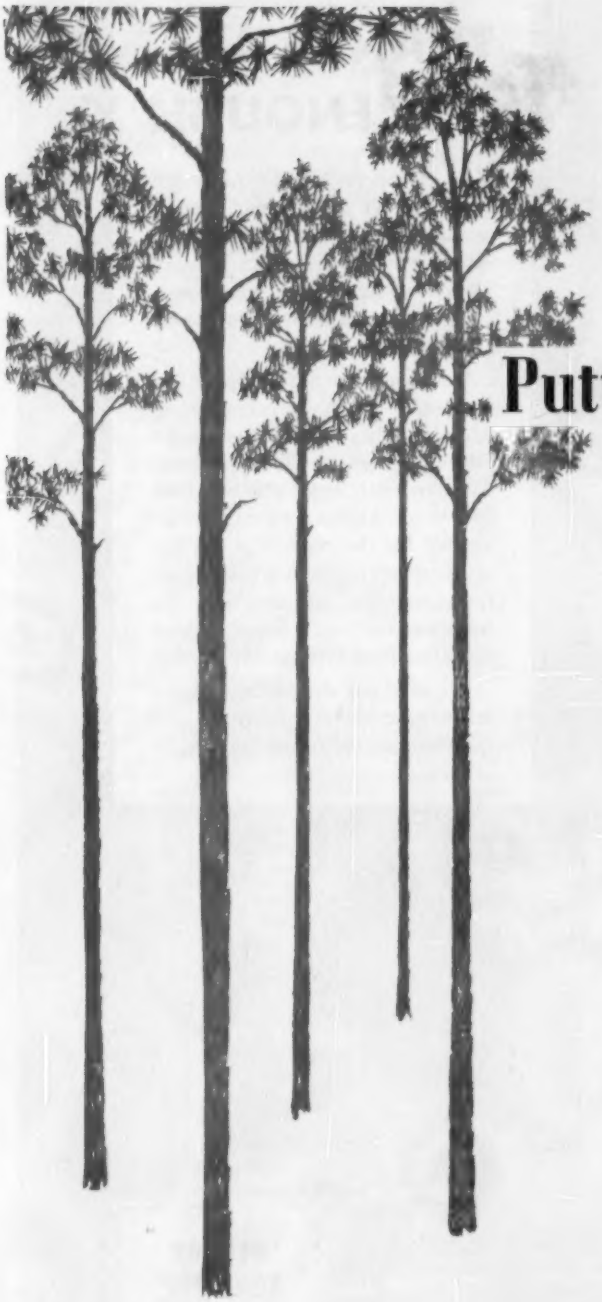
Time: 8:30 a.m. to 5:30 p.m. Cost per person, $2.75 (including luncheon). Open to men only. Clothing should include rainwear, heavy shoes, and warm jackets.

**Friday, October 21**

**Mt. Hood National Forest Tour.**—The Mt. Hood National Forest is close to the metropolitan Portland area. It contains 1,108,998 acres. The tour will visit the Clackamas Working Circle where modern forest practices and logging methods used in the Pacific Northwest can be seen. Timber sale proce-

(Continued on page 777)

DANT & RUSSELL, INC.
General Sales Offices, Portland, Oregon
TO THE MARKETS OF THE WORLD
D&R
Pacific Coast Forest Products
To assure the great and steady flow of products for world markets, Dant & Russell, Inc. has acquired interests in forest lands, mills, factories and processing plants. A wide diversity of products of the forest are shipped by rail . . . by highway . . . by sea . . . including Dant & Russell's own ships
Employees and representatives form a far flung organization embracing thousands of firms and individuals.
Domestic and Export Lumber • Frames • Mouldings • Plywood • Doors • Sidings
Battery Separators • Fir-Tex Products • Hardboards



# Putting down roots

*10,000,000 pine seedlings* — that's what Gair is planting yearly as part of its reforestation program.

This program serves to increase the productivity of Gair's 570,000 acres of woodlands located in Florida, Georgia, South Carolina, Louisiana and Arkansas — a substantial investment increased daily by nature and guided by skilled forest management.

These timberlands will supply the pulpwood of tomorrow to be converted into Gair paper bags and paperboard containers for retailers and manufacturers throughout the nation.

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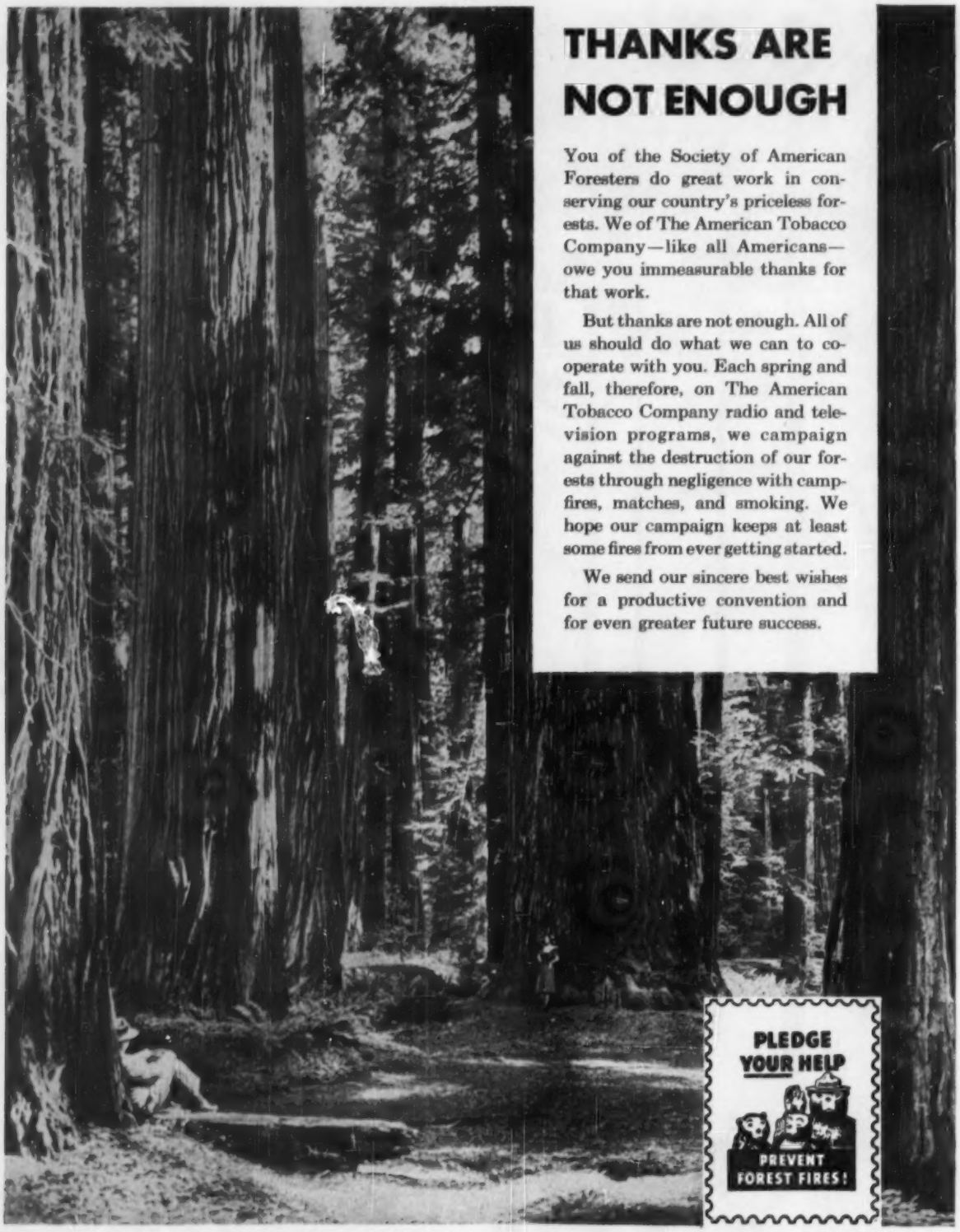
SHIPPING CONTAINERS • FOLDING CARTONS
PAPERBOARD • KRAFT BAGS AND WRAPPINGS

ROBERT GAIR COMPANY, INC. • 155 EAST 44TH STREET • NEW YORK 17, N.Y.




# THANKS ARE NOT ENOUGH

You of the Society of American Foresters do great work in conserving our country's priceless forests. We of The American Tobacco Company—like all Americans—owe you immeasurable thanks for that work.

But thanks are not enough. All of us should do what we can to cooperate with you. Each spring and fall, therefore, on The American Tobacco Company radio and television programs, we campaign against the destruction of our forests through negligence with campfires, matches, and smoking. We hope our campaign keeps at least some fires from ever getting started.

We send our sincere best wishes for a productive convention and for even greater future success.

*The American Tobacco Company*

AMERICA'S LEADING MANUFACTURER OF CIGARETTES

LUCKY STRIKE · PALL MALL · HERBERT TAREYTON · FILTER TIP TAREYTON

dures, access road development, and forest management policies of the U. S. Forest Service which are typical of problems on federal lands in the West will be viewed.

Time: 8:30 a.m. to 5 p.m. Cost per person, $3.50 (including luncheon). Ladies are invited. Clothing should include rainwear, heavy shoes, and warm jackets.

**Forest Industries Tour.**—This tour will visit the forest industries of Longview, Wash., the most integrated forest utilization center of the world. Here will be seen veneer and plywood manufacture, sawmilling, pulp and paper production, bark utilization, shingle and shakes manufacture, and pole and piling yards. Plants of the Weyerhaeuser Timber Company, Long-Bell Lumber Company, and Longview Fibre Company will be visited.

Time: 8:30 a.m. to 5:30 p.m. Cost per person, $2.25 (including luncheon). Ladies are invited. Clothing should be suitable to a mill tour. Raincoats should be taken.

### Ladies Activities

On Sunday afternoon, October 16, there will be a tea in the Gallery of Trees, Portland's Forestry Building.

On Monday, October 17, a field trip has been scheduled to scenic Mt. Hood with luncheon at Timberline Lodge. Transportation will be by bus.

On Tuesday, October 18, a special style show will be held in connection with brunch. In the evening the ladies are invited to the barbecue in Oaks Park.

On Wednesday, October 19, at 10 a.m. there will be held a ladies' forestry forum, directed by Dean W. F. McCulloch of Oregon State College. In the evening will be held the Society's annual dinner, preceded by a social hour, in the Multnomah Hotel.

On Thursday, October 20, ladies are welcome to take the Industrial Tree Farm Tour, described under Field Trips.

On Friday, October 21, ladies are welcome to go on either the Mt. Hood National Forest Tour or the Forest Industries Tour, described under Field Trips.

### Hotel Reservations

It is suggested that those expecting to attend the meeting arrive in Portland on Sunday, October 16, or not later than the morning of Monday, October 17. The open meetings start on Monday morning.

The Multnomah Hotel will be the headquarters hotel where most scheduled events will be held. Although the Multnomah contains 600 rooms, it will not be able to accommodate all those in attendance, hence other hotels are cooperating.

A special S.A.F. Housing Committee has been set up for the meeting, and all requests for room reservations

(Continued on page 779)

**EUROPEAN TREE SEEDS**

Specialties: seeds for Xmas Trees and Forestry

*Write for Price List*

JULIUS STAINER
Kilnhouses
Wiener — Neustadt
Austria

*Greetings from*

**HAMMOND LUMBER COMPANY**

*"Finest Redwood Lumber"*

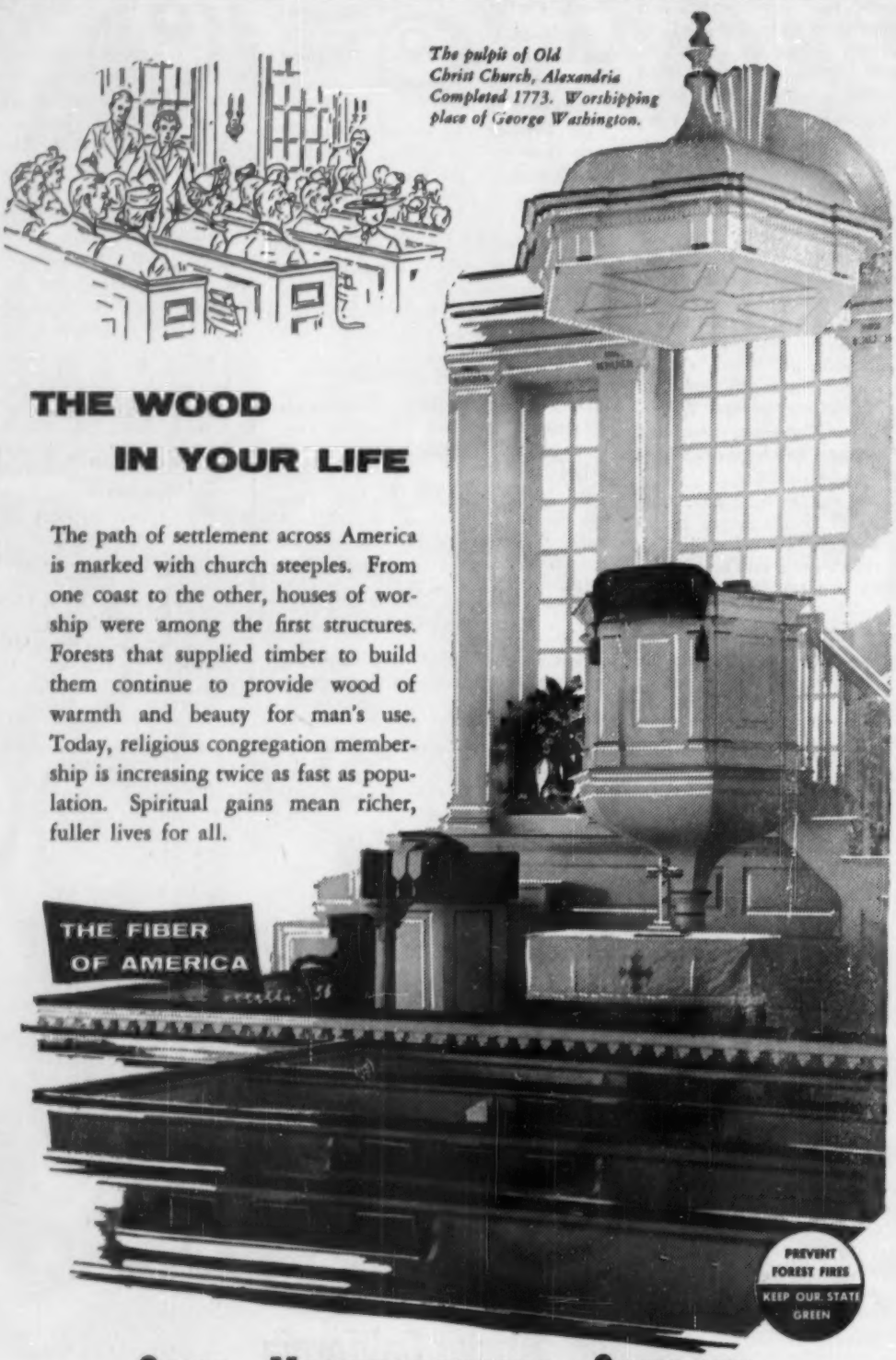
**Mills at Samoa, Eureka, Big Lagoon and Orick, California**

**Head Office: San Francisco**

*The pulpit of Old Christ Church, Alexandria Completed 1773. Worshipping place of George Washington.*

**THE WOOD IN YOUR LIFE**

The path of settlement across America is marked with church steeples. From one coast to the other, houses of worship were among the first structures. Forests that supplied timber to build them continue to provide wood of warmth and beauty for man's use. Today, religious congregation membership is increasing twice as fast as population. Spiritual gains mean richer, fuller lives for all.




**CAMP MANUFACTURING COMPANY**
**FRANKLIN, VIRGINIA**

should be addressed to this committee, as follows:

Housing Committee, Society of American Foresters; c/o Portland Chamber of Commerce; 824 S. W. Fifth Avenue; Portland 4, Oregon.

The reservation coupon printed on page 781 may be used. Subscribers who do not wish to cut the coupon from their JOURNALS may request reservations simply by providing the Housing Committee with all the information requested on the coupon.

Each reservation request should indicate first choice, second choice, and third choice hotels. As usual, single rooms may be scarce, hence when possible twin-bed rooms should be used.

There follows a list of cooperating hotels and their rates. All quoted rates are with bath unless otherwise noted. Some hotels have rooms with connecting baths at lower rates.

#### Hotels

Multnomah Hotel, S.W. Fourth Avenue and Pine Street. Single rooms, $6 to $8; double, $8 to $13; twin beds, $9 to $13. Sets of twin-bed rooms and double rooms connecting, for four people, $15 to $16. Suites available.

Benson Hotel, S. W. Broadway at Oak Street. (Four blocks from the Multnomah.) Single, $6 to $10; double, $8 to $15; twin beds, $11.50 to $15.

Imperial Hotel, S. W. Broadway at Stark Street. (Five blocks from the Multnomah.) Single, $4 to $6; double, $6 to $8; twin beds, $7 to $9.

Congress Hotel, S. W. Sixth Avenue and Main Street. (Ten blocks from the Multnomah.) Single, $5.50 to $7; double, $6 to $8; twin beds, $7.50 to $8.50.

New Heathman Hotel, 712 S. W. Salmon Street. (Eleven blocks from the Multnomah.) Single, $6.50; double, $8; twin beds, $8.50.

In addition to the foregoing hotels, there are other smaller hotels within the downtown area. The Housing Committee will supply a list of these hotels with their addresses for those who request it.

Motels and motor courts are available outside the downtown area. Their rates for single rooms with bath are from $5.50 up; doubles are $6.50 and up. The Housing Committee will make motel reservations, or will furnish members with a list of motels for those who may wish to request their own reservations.

### Meeting Committees

The general chairman for the meeting is J. Herbert Stone, U. S. Forest Service, 729 N. E. Oregon Street, Portland 8, Ore.

Assisting him are the following committees and their personnel.

#### Program Committee

The chairman of the Program Committee is W. F. McCulloch, School of Forestry, Oregon State College, Corvallis, Ore. The other members are K. G. Fensom, Roger Guernsey, Clare Hendee, and A. J. Sandoz.

#### Arrangements Committee

The chairman of the Committee on Arrangements is Clarence Richen, Crown Zellerbach Corp., 1400 Public Service Building, Portland, Ore.

Assisting him is Laurence C. Jolley, U. S. Forest Service, 729 N. E. Oregon Street, Portland 8, Ore.

Heading up special task committees are the following individuals:

*Information and Publicity,* Albert Arnst.

*Hotel Reservations and Housing,* Howard Roberts.

(Continued on page 781)

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**FOR**
**FOREST PLANTING OR ORNAMENTALS**

For 90 years we have been growers and propagators of evergreen seedlings and transplants, and are in a position to supply you with quality planting stock in small or large amounts, at reasonable prices. Write for complete trade list.

**EVERGREEN NURSERY CO.**
Established 1864 Sturgeon Bay, Wisconsin

**BARTLETT**
**WE Combination Pruner and Saw**

**Is now available for immediate shipment. Simply write for our attractive folder describing this Combination in detail and we will reply by return mail.**

**Tree Paint**

**BARTLETT TREE PAINT**
Protects pruning wounds. Easily applied. Will not freeze.

**No. 777— LOPPING SHEAR**
26" White Ash Handles with Plain or Strap Ferrules. This shear is unsurpassed for cutting qualities. Tool Steel Blades.

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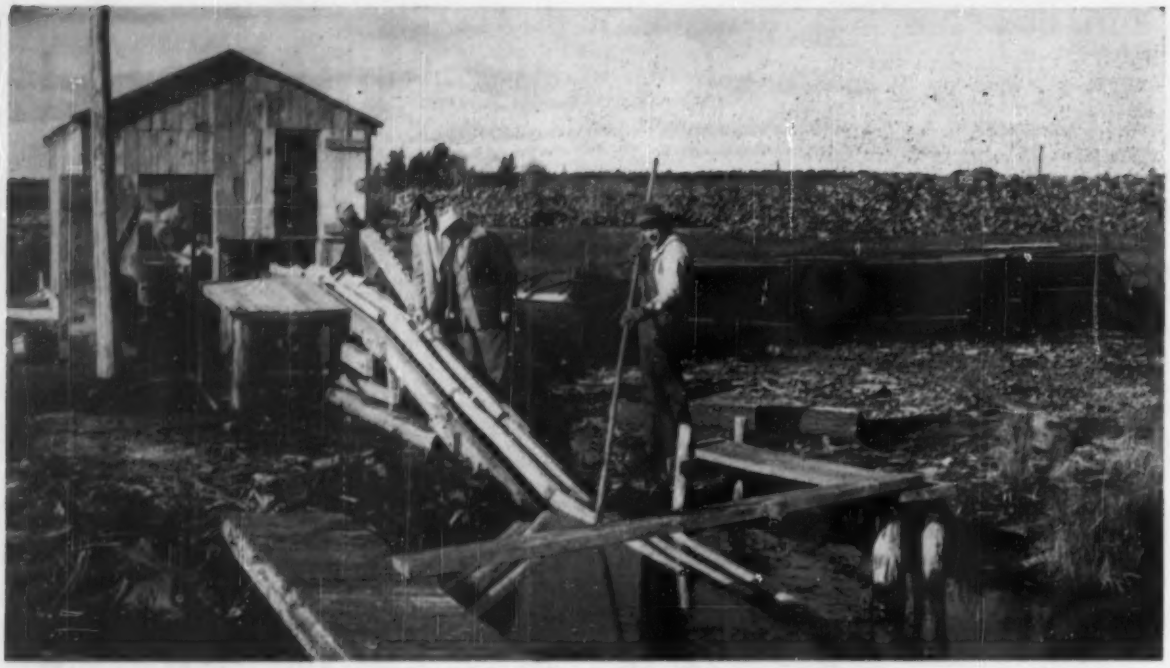

Here at the Grinols Implement & Fuel Co. plant in Bemidji, Minn., peeled posts are conveyed automatically from the soaking pond through spray shed, where Osmosalts Treatment is actually applied, and then removed to stacking area for a 30-day diffusion period.

# INEXPENSIVE WOOD TREATING PLANT
## Brings New Profits to Sawmill

Earl L. Grinols of Grinols Implement & Fuel Co. of Bemidji, Minnesota, realized for over ten years that there was a tremendous future in wood treating. However, at that time, he inquired and found that it would cost around $50,000 to build a pressure treating plant. Consequently, the matter was "allowed to drag," as Earl put it. But in 1949 Mr. Grinols ran into a superintendent of one of the mines in his area, who wanted to buy treated ties. This mine official had heard of the Osmose Wood Preserving Process and experimented on a number of ties. The simplicity and proven effectiveness of the treatment convinced him that Osmose Treated ties were the answer to reduced costs in his mine.

Upon inquiring, Mr. Grinols discovered that he could treat railroad ties with the Osmose Treatment for a fraction of the cost of any other method and that it wasn't necessary to invest in a complicated plant to do so. Any species of green or water-soaked wood can be used and treating solution can be applied by spray or dip method. The Grinols Company immediately set up a modest treating tank at their Bemidji sawmill and found many ready customers. Last year when they started getting orders for thousands of ties at a crack they had to install the system shown above. Since then, they have tapped the huge farm market and are now producing treated Tamarack fence posts which are sold through their exclusive sales agents in Minneapolis.

If you own a sawmill and would like full details on how you can cash in on the ever-expanding market for treated railroad ties, mine timbers, fence posts and lumber without making a big investment, write to Joseph M. Bray, Vice-President, Osmose Wood Preserving Co., 980 Ellicott Street, Buffalo, N. Y.

(Advertisement)

*Registration and Welcome,* Martin L. Syverson.
*Exhibits,* Arthur K. Roberts.
*Field Trips,* Nels Jeffers.
*Ladies Entertainment,* Mrs. Robert Conklin.
*Meeting and Conference Rooms,* Owen Cramer.
*Annual Dinner Arrangements,* Paul Vance.
*Projection and Amplifying Equipment,* Clyde Stratton.
*"Sergeant-at-Arms,"* Louis Alexander.
*Special Assignments,* Robert D. Hostetter.

SOCIETY OF AMERICAN FORESTERS
ANNUAL MEETING
Portland, Oregon. October 16-19, 1955

....., 1955

Housing Committee, Society of American Foresters,
c/o Portland Chamber of Commerce,
824 S. W. Fifth Avenue,
Portland 4, Oregon.

First Choice Hotel .....
Second Choice Hotel .....
Third Choice Hotel .....

Please make a reservation for the following room accommodations for arrival on October ....., a.m. / p.m. Departure date, October .....

I understand that accommodations will be provided at the daily rate specified, if available; otherwise the next nearest rate will apply.

..... Single room with bath. Rate, $.....
..... Double-bed room with bath. Rate, $.....
..... Twin-bed room with bath. Rate, $.....
..... Suite (parlor, twin-bed room, and bath). Rate, $.....
..... Other. (Specify accommodations desired.) .....
..... Rate, $.....

The above room accommodations are requested for the following persons, in addition to myself. (Print or typewrite names and addresses legibly.)

.....
.....
.....

My name: .....
Street address: .....
City, zone, state: .....

PRELIMINARY FIELD TRIP RESERVATIONS

Please make the following reservations for field trips. (Tickets to be purchased at the meeting.)

| | Number of persons |
|---|---|
| Sunday, October 16; afternoon | |
| Portland City Forest | _____ |
| Thursday, October 20; all day | |
| Industrial Tree Farms | _____ |
| Tillamook Burn | _____ |
| Friday, October 21; all day | |
| Mt. Hood National Forest | _____ |
| Forest Industries of Longview | _____ |

**Cumulative Volume Tally Sheets**

**Research Based—Field Designed—Research Tested**

**Available in log-height or adjustable height curve (localized) form in**

**International ¼" Kerf Log Rule**
**Scribner Log Rule**
**Doyle Log Rule**
**Standard Cords**

•

**Forester's Traverse Table Field Work Sheet**

**Designed for compass work — degrees only.**

**Fits hip - pocket tatum holder.**

**Calculations are simple arithmetic and may be made in the field as traverse is run.**

*Write for samples and descriptive folder*

**H. NIEDECKEN COMPANY**
MFG. STATIONERS SINCE 1847
511 N. WATER ST.
**MILWAUKEE 2, WISCONSIN**

## Nominations for Council Received

All voting members are hereby notified that the regular biennial election will be held December 3, 1955. A president, vice president, and nine other members of the Council will be elected for the two-year term 1956-1957.

The present Council is listed in the box on page 754.

The JOURNAL has carried monthly calls for nominations since the March issue. Nominations were closed October 1. On the date this issue went to press the below listed nominations had been received. Nominations received after this issue went to press but prior to October 1 will be reported in the November issue.

**For President**

George B. Amidon, International Falls, Minn.

George A. Garratt, New Haven, Conn.

DeWitt Nelson, Sacramento, Calif. (Vice president, 1954-1955.)

**For the Council**

B. E. Allen, Savannah, Ga.

N. T. Barron, Franklin, Va.

Philip A. Briegleb, New Orleans, La.

Randolph M. Brown, St. Paul, Minn.

C. H. Coulter, Tallahassee, Fla. (Council member, 1954-1955.)

S. G. Fontanna, Ann Arbor, Mich. (Council member, 1954-1955.)

Paul M. Garrison, Bogalousa, La.

Maurice K. Goddard, Harrisburg, Pa.

P. D. Hanson, Missoula, Mont. (Council member, 1954-1955.)

Verne L. Harper, Washington, D. C.

George B. Hartman, Ames, Iowa

*KNOW YOUR NOMINEES*

The November issue of the JOURNAL will present photographs of nominees for President and for Council membership.

Edwin F. Heacox, Tacoma, Wash. (Council member, 1954-1955.)

William P. House, Cresham, N. H.

Joseph S. Illick, Syracuse, N. Y. (Council member, 1954-1955.)

Edward N. Munns, Concord, Calif.

Harrod B. Newland, Frankfort, Ky.

Albert D. Nutting, Augusta, Me.

Chester J. Olsen, Ogden, Utah.

Richard J. Preston, Raleigh, N. C.

J. Herbert Stone, Portland, Ore. (Council member, 1954-1955.)

Henry J. Vaux, Berkeley, Calif.

George O. White, Jefferson City, Mo.

## Nominations for Grade of Fellow Received

The JOURNAL has carried monthly calls for nominations for the grade of Fellow since the March issue. Nominations were closed October 1. A current list of Fellows of the Society occurs on page 609 of the August issue.

(Continued on page 784)

**J. NEILS LUMBER COMPANY**

J N

*Manufacturers of highest quality forest products since 1895*

**IDAHO WHITE PINE**
**PONDEROSA PINE · DOUGLAS FIR**
**LARCH · ENGELMANN SPRUCE**

***MILLS:*** **Libby and Troy, Montana; Klickitat, Washington**

***SALES OFFICES:*** **Minneapolis, Minn.; Chicago, Ill.; New York City, N. Y.**

# it's all part of our job...

Harvesting our woodlands crop is no short term, one-shot job. Starting on the desk and drawing board, it continues long after the wood becomes paper. It involves making sure that forest lands remain productive for another generation.

"Each year the philosophy of careful forest operation permeates deeper, so that each man—whether cutter or planner—feels his responsibility."—Quoted from Kimberly-Clark Corporation annual report for 1955.

KIMBERLY-CLARK CORPORATION NEENAH, WISCONSIN

On the date of going to press, the following Members had been nominated for the grade of Fellow:

Reed W. Bailey, Ogden, Utah
Willis M. Baker, Hiwassee Dam, N.C.
John S. Boyce, New Haven, Conn.
Robert W. Cowlin, Portland, Ore.
Dwight B. Demeritt, Bangor, Me.
Samuel B. Detwiler, Boulder, Colo.
James F. Dubuar, Wanakena, N. Y.
Stanley G. Fontanna, Ann Arbor, Mich.
Bernard Frank, Washington, D. C.
Louis J. Freedman, Old Town, Me.
Charles G. Geltz, Gainesville, Fla.
S. R. Gevorkiantz, St. Paul, Minn.
J. Alfred Hall, Madison, Wis.
Paul A. Herbert, East Lansing, Mich.
Willard R. Hine, Atlanta, Ga.
Julius V. Hofmann, Raleigh, N. C.
Frank H. Kaufert, St. Paul, Minn.
F. Paul Keen, Berkeley, Calif.
Chas. J. Kraebel, Berkeley, Calif.
C. Otto Lindh, Albuquerque, N. Mex.
Gordon D. Marckworth, Seattle, Wash.
Arthur C. McIntyre, Harrisburg, Pa.
Nicholas T. Mirov, Berkeley, Calif.
Clarence W. Richen, Portland, Ore.
T. Schantz-Hansen, Cloquet, Minn.
Edwin H. Steffen, Pullman, Wash.
Raymond F. Taylor, Juneau, Alaska
Arthur T. Upson, Tucson, Ariz.
Philip C. Wakeley, New Orleans, La.
R. H. Westveld, Columbia, Mo.
Herman Work, Staunton, Va.

## The President's Column

E. L. DEMMON

Since the fall of 1950, following an amendment to the Constitution, Society membership has been open to qualified forestry school students. Now that a new school year is just getting under way, I am addressing this column to prospective Student Members.

The response to our Student Membership program has been very gratifying. The number of Student Members has been increasing each year until in June 1955 there were 774 out of a potential of about 1,300 eligibles, or 60 percent.

Student Membership is open to any junior, senior, or graduate student (not eligible for Junior Membership) regularly enrolled in an approved curriculum in a forestry school accredited by the Society. An approved curriculum includes not less than one three-quarter-credit course in each of the following subjects: silviculture, forest management, forest protection, forest economics, and wood utilization.

Student Members are not only members of the Society but also of the Section and Chapter in which their schools are located. They have no vote, but are encouraged to attend any meeting of the Society. Officers of several Chapters and Sections located close to forestry schools have made it a point to extend special invitations to current and prospective Student Members to attend meetings

20 MILLION TREES a Year!

Note Heavy Roots and Sturdy Top of Musser seedling in photo.

Seedlings for Christmas Tree and Forest Tree plantings; Transplants for Conservationists, Timber Operators and Farmers.
MUSSER offers the world's largest selection of quality trees, at a price made possible by tremendous volume.

*Write for Tree Catalog, wholesale planting list and prices. Ask for Free Christmas Tree Growers' Guide.*

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World's most powerful ALL-IN-ONE POWER MEGAPHONE...

AUDIO Hailer

Send for free literature.

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NOW . . . new CUSHION BASE
absorbs road shocks & vibration, reduces wear, increases life of
FORESTER
*SEAL TITE*
DRIP-TORCH

Proved superior in over 9 years field service

Approved for use by U.S. Forest Service

NO Flash-back
NO Fuel slopping
NO air-pump
NO pre-heating
NO pressure build-up
NO explosive vapors
Instant operation

SAFE — EFFICIENT
RELIABLE — ECONOMICAL
Burns Diesel Fuel or Stove Oil

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WESTERN FIRE EQUIPMENT CO.
69 Main St., San Francisco 5

and take an active part in the programs.

Dues of Student Members are $3 per year. Student Members are not required to pay Section or Chapter dues. When they receive their forestry degree, Student Members are automatically advanced to Junior Membership, but their new dues ($6 per year) do not begin until the following calendar year. Furthermore, they are not assessed the usual $5 admission fee.

Student Members receive the JOURNAL OF FORESTRY as part of their membership. This represents a considerable saving as the cost per member of the JOURNAL was $6.76 in 1954 and regular subscriptions to the JOURNAL for nonmembers are $7.50 per year. Also, average dues of all Society members are $9 per year, so students profit greatly by becoming members of our professional society while still in school.

Each accredited forestry school selects one of its faculty members to serve as the local Section representative in handling Student Member applications. The signatures of three voting members (generally from the school faculty) are required on the application form.

The reason for being a Student Member was well summed up by Harold J. Anderson while he was studying forestry at North Carolina State College (Jour. Forestry, Oct. 1954, pp. 800-802):

> "Student Membership in the Society of American Foresters is an investment in the future of forestry, and ultimately an investment in one's own future as a forester. For this reason, if for no other, young foresters need the Society, and the Society needs them."

The Society has set up the Student Membership grade to enlist the interest of prospective foresters in our professional organization while they are obtaining their college training. This makes it relatively easy for students to join the professional organization at a reasonable cost. I urge all qualified students to join and help our profession improve itself and better serve its members and the public.

*E. L. Demmon*


CUT COSTS 90%
PREVENT ACCIDENTS

• WASH WINDOWS FOUR STORIES HIGH

REMOVE LIGHT GLOBES 60 ft. up

• PRUNE TREES & PICK FRUIT 60 ft. up

Quick-Easy!
WATER FLOW BRUSH
HUNDREDS OF USES!
FOR HOME, SHOP, FACTORY, FARM
COMBINE SECTIONS OF POLES TO MAKE ANY LENGTH up to 60 ft.
INSIDE AND OUT
ODD ANGLES

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*Two Great Gangsaws by* **M.E.***

***Men with *experience* at Mill Engineering build a lifetime of quality and service into every one of their machines. Engineered for perfection, Mill Engineering SUNBOS and SUPERS have withstood the test of time and heavy use in every one of hundreds of successful installations; producing more lumber at less cost.**

***Increase profits!*** Mill Engineering "Sunbos" and "Supers" give you maximum lumber output per 8-hour shift; *and* you get up to half again as much lumber per log due to close tolerance sawing with thinner blades. Let us prove the theory of Gangsaw efficiency in your plant. You can depend on Mill Engineering—America's first and most experienced manufacturer of quality Gangsaws for logs and cants—exclusively.

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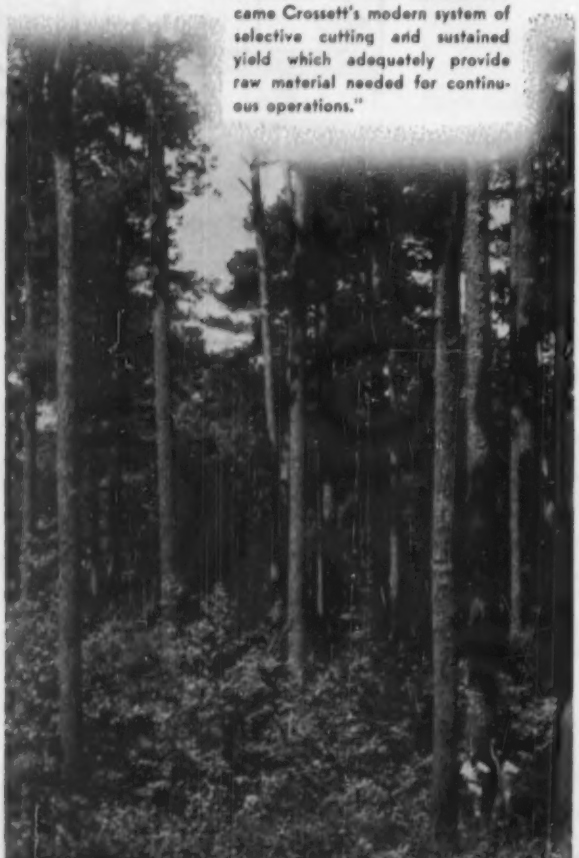
# Nature is Our Chief Forester

"With the coming of Crossett's first forester, propagation of young growth was furthered by the practice of leaving the virgin growth seed trees at evenly spaced intervals throughout the forest. Within a few years, these big trees had effectively re-seeded much of the area previously cut over. From then on reforestation activities were progressively expanded. The country's best experts in forest practices were called in. From these consultations came Crossett's modern system of selective cutting and sustained yield which adequately provide raw material needed for continuous operations."



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Crossett, Arkansas

***Blackburn Handy Marking Flags***

## NEW CONVENIENT DURABLE VISABLE

Made of 15½ gauge stiff wire, available in three lengths—21", 30", 36", with choice of red, white or yellow plastic flag, 2½ X 3½", securely fastened at one end.

1000 Markers, 21" weigh approximately 23#
Why carry bulky stakes

Used by technicians in all fields where markers are used. Highly recommended

Speeds up work — lessens costs

The Handy Marking Flags are what you have been waiting for.

***Reasonably priced***
***Immediate delivery***

**Blackburn Manufacturing Co.**

ROYAL, NEBRASKA

**PANAMA PRESSURE TYPE TREE MARKING GUN**

*Approved for use by U. S. Forest Service*

**ENABLES THE OPERATOR TO:**

Mark more trees with less paint—
Carry his supply of paint on his back instead of in his hand—
Clean his tip automatically each time he marks a tree—
Operate with complete freedom of both hands—
Clean his Gun more readily at the end of a day's work—
And all together do a better, faster and more economical marking job—

Constantly increasing sales indicate that we have a

**SATISFACTORY TREE MARKING GUN**

**PANAMA PUMP COMPANY**

HATTIESBURG, MISS.

# Membership Applications and Advancements

Proposals for admission, advancement, and reinstatements received in the Society office during the month of August are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of November 1, 1955. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

### Appalachian Section

*Junior Grade*

Ebel, B. H., Entom., U.S.F.S., Asheville, N. C.; State Univ. of N. Y., B.S.F., 1950; Univ. of Minn., M.S., (Entomology), 1954.

Taras, M. A., Forest Products Tech., U.S.F.S., Asheville, N. C.; Pa. State, B.S.F., 1942; M.F., 1948.

*Member Grade*

Coile, T. S., Rt. 2, Box 376, Durham, N. C. Reinstatement.

### Central States Section

*Member Grade*

Ashley, B. S., Farm Forester, Ohio Div. of Forestry, Delaware, Ohio; Mich. State, B.S.F., 1949. (Junior, 1950).

*Affiliate Grade*

Murphey, W. K., Instructor, Ohio Agric. Expt. Sta., Orrville, Ohio; Pa. State, B.S., (Wood Utilization), 1952; M.F., 1953.

### Columbia River Section

*Junior Grade*

Malcolm, R. M., Asst. Prof., Ore. State, Corvallis, Ore.; Yale, M.F., 1951.

Thede, R. W., Forester, Bur. of Land Mgmt., Salem, Ore. Reinstatement.

Thomsen, J. A., Forester, Bur. of Land Mgmt., Medford, Ore. Reinstatement.

Yawney, H. W., Forester, U.S.F.S., Bend, Ore.; Pa. State, B.S.F., 1955.

*Member Grade*

Dubuar, C. M., 2104 Roberts Rd., Medford, Ore. (Junior, 42R55).

*Affiliate Grade*

Saunders, T. A., Forester, Bur. of Land Mgmt., Medford, Ore.; Okla. A & M, B.S., (Forestry), 1951.

### Gulf States Section

*Affiliate Grade*

Bone, C. D., Supv., U.S.F.S., Gulfport, Miss.

Byrd, H. L., Asst. Dist. Forester, Champion Paper & Fibre Co., Livingston, Texas; Stephen F. Austin State College, B.S., (Forestry), 1951.

### Intermountain Section

*Junior Grade*

Helseth, T. P., Deputy State Conservationist, Soil Cons. Service, Boise, Idaho. Reinstatement.

### Kentucky-Tennessee Section

*Affiliate Grade*

Dodson, F. W., Timber Cruiser, Cumberland Case Co., Sparta, Tenn.

Simmons, G. H., Timber Cruiser, Cumberland Case Co., Rock Island, Tenn.

### New England Section

*Affiliate Grade*

Childs, M. R., Tidewater Farm, Dover, New Hampshire; Univ. of N. H., B.S., (Forestry), 1955.

### New York Section

*Junior Grade*

Evans, R. L., Project Forester, N. Y. State Cons. Dept., Rochester, N. Y.; State Univ. of N. Y., B.S.F., 1952.

Walker, H. C., 811 South Ave., Syracuse, N. Y. Reinstatement.

### Northern California Section

*Junior Grade*

Snyder, A. P., Dist. Ranger, U.S.F.S., North Fork, Calif.; Univ. of Calif., B.S.F., 1941.

*Member Grade*

Eaton, C. B., Entomologist, U.S.D.A., Orinda, Calif. (Junior, 35R55).

### Puget Sound Section

*Affiliate Grade*

Williams, G. S., Field Supv., Wash. State Div. of Forestry, Ellensburg, Wash.

*Associate Grade*

Holland, A. M., Instructor, Everett Junior College, Everett, Wash.

### Southeastern Section

*Student Grade*

ALABAMA POLYTECHNIC INSTITUTE

Bourns, P. H.
Conn, H. H.
Davis, B. G.
Hammond, R. B.
Haynie, R. H.
Huff, G. A.
Kress, J. M.
Lynn, T. E.
Mozingo, T. B.
Smith, C. D.
Williams, J. H.

UNIVERSITY OF GEORGIA

Meadows, J. M.

*Junior Grade*

Bielling, P. E., Grad. Student, Univ. of Fla., Gainesville, Fla.; Univ. of Fla., B.S.F., 1955.

Fulghum, C. B., 250 N. Jefferson St., Milledgeville, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1955).

Garrett, W. G., Buena Vista, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1954).

Green, E. B., 611 Hunter St., Opelika, Ala. Reinstatement.

Jones, P. K., Box 147, Athens, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1954).

McDonald, J. A., 2070 McConnell Dr., Decatur, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1955).

# Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.


## NOTICE TO INDUSTRY

**Personnel Placement**

**A service for industrial firms, foresters, and timbermen—to find the best qualified man for the job. List your openings in forestry and allied fields with me. I can supply information on qualified men. Inquiries handled confidentially.**

• • •

***Foresters*** **send me data on your training and qualifications. Records are confidential. I maintain industry contacts and can advise you on job openings. No fee required unless position is accepted.**

**Keith Cranston, *Forestry Consultant***
**LELAND, MISSISSIPPI**


## Positions Available


**PERSONNEL WANTED**

**Expansion of our hardwood operation creates openings for:**

**JR. EXECUTIVE TRAINEE**
**MALE STENOGRAPHER**
**LUMBER INSPECTOR**

***Salaries open.***
***Top quality men.***

**PIKE LUMBER CO., INC.**
**Akron, Indiana**


Public Relations Department position open in major national trade association located on Eastern Seaboard. Forest products background desirable but not absolutely necessary. Want man 35 years or younger, administrative ability, pleasing personality, aptitude for writing clearly and effectively. Public relations experience with media would be helpful. Bright future for the right person.

**Box A, *Journal of Forestry*, Mills Building, Washington 6, D. C.**

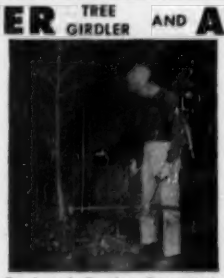
## Position Wanted

Forester, 27, B.S.F. Michigan Tech., married, one child. Currently serving as 1st Lt. in U. S. Army. 2½ yrs. experience Forest Service on timber access road construction and survey. 2 yrs. supervisory exp. Corps of Eng. road and building construction in Arctic regions. Desire employment in forestry which requires forestry and/or engineering experience. Available December 15.

**Box K, *Journal of Forestry*, Mills Building, Washington 6, D. C.**


**LITTLE BEAVER TREE GIRDLER AND ATTACHMENTS**

Little Beaver Tree Girdler, cuts girdle around tree at walking speed. One man will girdle more acres per day than several men using other methods.



Brush and Pruning Saw attachments to take care of any brush cutting or pruning job. four foot sections may be added to get desired height. Brush saw does the work of several men.

A Post Hole Auger designed for one man operation, doing the work of heavy equipment diggers, holes quickly and easily made in any soil type. Wood auger may be attached for wood drilling.

HAYNES TREE GIRDLER

FOR DETAILS SEE YOUR DEALER OR WRITE:
**HAYNES MFG. CO.** LIVINGSTON, TEXAS, U. S. A.

Parrish, K. L., Rt. 3, Jesup, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1954).
Reid, T. M., Box 139, Athens, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1955).
Shelhorse, A. W., Fain Hall, Athens, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1954).
Shoptaw, J. H., 180 Fortson Dr., Athens, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1954).
Stephens, E. J., 222 Clark Hall, Athens, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1953).

*Affiliate Grade*

Belote, W. F., Landowner & Lbr. Manufacturer, Dublin, Ga.

**Wisconsin-Michigan Section**

*Junior Grade*

Fryes, S. D., 1201 Lake Dr., Grand Rapids, Mich. Reinstatement.
Westerberg, D. D., Forester, U.S.F.S., Escanaba, Mich.; Univ. of Minn., B.S.F., 1952.

*Member Grade*

Jacobs, H. C., 442 S. 6th Ave., Park Falls, Wis. Reinstatement.

## Allegheny Section Summer Meeting

The summer meeting of the Allegheny Section was held at Elkins, W. Va., on August 5 and 6, 1955, with about seventy-five members attending.

Friday, August 4, was devoted to a field trip over work at the Fernow Experimental Forest at Parsons. Sidney Weitzman and crew led the field trip and discussions of cutting practices, road lay out, and logging methods.

On Friday evening, an informal dinner was staged at Elkins. President E. L. Demmon discussed the work of the Society, and its accomplishments. Henry Clepper outlined what the Society had been doing during the past year, and some of their future plans.

At a meeting of the Executive Committee, approval was given plans for the winter meeting, to be held at Philadelphia on February 10 and 11, 1956. Proposed changes in the by-laws of the Section were approved and the secretary instructed to submit them to the membership at the time of the regular election.

Saturday's meeting was devoted to a field trip over a portion of the Monongahela National Forest, ending up at Spruce Knob Lake for lunch.

WILLIAM A. PARR
*Secretary-Treasurer*

## Plan Memorial to "Tama Jim" Wilson

Plans of the Iowa Chapter of the S. A. F. for a memorial to James "Tama Jim" Wilson, Secretary of the U. S. Department of Agriculture from 1897 to 1913, have been announced by Professor George W. Thomson, Forestry Department, Iowa State College, Ames.

The memorial is proposed for location in Tama County, as recognition of Secretary Wilson's outstanding contributions to forestry and the many fields of agriculture during the 16 years he served in the cabinets of three presidents—William McKinley, Theodore Roosevelt, and William Howard Taft.

Plans for the memorial are still indefinite, as since the forester's announced their intentions several other groups have indicated an interest in participating. A temporary committee has been appointed to investigate the possibilities under the chairmanship of George B. Hartman, head of the Forestry Department, Iowa State College.

### Ivan Watson Crum (1910-1955)

Ivan Watson Crum died at his home in Roseburg, Ore., August 9, as the result of a heart attack. At the time of his death Mr. Crum held the position in the U. S. Forest Service of check scaler for southwestern Oregon. A 1936 graduate of Oregon State College School of Forestry, he spent his career with the Forest Service in the tall timber of his native state.


**Thanks to the SOCIETY of AMERICAN FORESTERS**

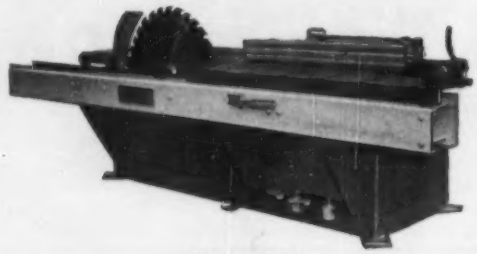
**This nation now has at its services the organized knowledge and experience of more than 10,000 professionally trained men. They have fostered sound forestry education and research. In many ways they have pooled their efforts in actual practice to the end that our natural resources may be perpetuated, improved, and utilized in the spirit of true conservation. As one business unit of the great wood-using industry our company is truly appreciative of the growing importance to it of a great, organized professional body of foresters.**

*We're helping to KEEP California GREEN*

**SACRAMENTO BOX & LUMBER CO.**

*Sacramento and Woodleaf, California*

**RICKER SHORT LOG BOLTER**



*Series 1000*

This is the basic machine to start your dimension stock business at the source of supply. Advise us what size of logs that you intend to work up, and the type of stock that you wish to make. We can furnish a free floor plan with "Walters" material handling equipment that can be tailored to suit your requirements.

**DIMENSION MILL EQUIPMENT CO.**
Deansboro, New York
U. S. A.

# Forestry News

### C.I.F. Convention

The 47th annual convention of the Canadian Institute of Forestry will be held October 5-7 at Saskatoon, Saskatchewan. Headquarters will be the Canadian National Railways' Bessborough Hotel. A two day field trip prior to the meeting is planned to Lac la Ronge, some 180 miles north of Prince Albert. A banquet at the convention is to be sponsored by the provincial government, marking Saskatchewan's fiftieth year as a province. Theme of the meeting: Forest Protection.

### New Building Board Filters Poison Gases and Atomic Fallout

A cheap wood fiber building board that filters poison gases, disease laden particles, and the radio active fallout of atomic explosions from the atmosphere, was recently announced by the U. S. Department of Agriculture and the Army Chemical Corps. With the new material, developed by the U. S. Forest Products Laboratory, under contract with the Chemical Corps, shelters can be built to protect troops and civilians from some of the most deadly effects of modern war, Dr. J. A. Hall, director of the Laboratory predicted.

The material, called "diffusion board," is now being extensively tested by the Laboratory and the Army Chemical Center, Md., for use in shelters. Although present small scale commercial production is for military testing purposes, the material should put shelter production within everyone's reach when it becomes available.

The fiberboard is the product of three years of research at the Forest Products Laboratory. Its developers are Dr. Alfred J. Stamm, research scientist at the Laboratory and Dr. Harold Tarkow, his assistant. They worked closely with Leonard Jonas, Chemical Corps officer in charge.

"The diffusion board looks much like ordinary building fiberboard widely used in house construction. Secret chemicals in it screen out deadly gases and particles. Life sustaining oxygen passes through it," Dr. Stamm said, "so that persons inside shelters won't suffocate. Likewise carbon dioxide gas given off in breathing can pass through it along with respiratory vapors. Pilot scale production tests at two plants have shown that the fiberboard can be manufactured with much the same equipment used to make ordinary building fiberboard. Any species of wood can be pulped to make it."

"We feel," Dr. Stamm said, "that with this material, troops and the general public can be pretty well protected from atomic dust, poison gas, and germ warfare."

The development work was done with military application foremost in mind such as shelters inside troop's barracks, aircraft hangars, and other military structures. The material has equal value, however, for use in homes and other civilian buildings during an attack by an enemy.

### Golden Anniversary of the Conservation Movement

A bipartisan group of congressmen —29 senators and 28 representatives— have introduced a joint resolution call-

WELCOME FORESTERS

. . . to the Pacific Northwest where the science of good forestry and new forests for man's progress have been growing together for 55 years.

TODAY we, like the Society, are planting the seeds of the future. Our congratulations to the foresters and to the profession which makes this future a bright one for both of us.

CROWN ZELLERBACH CORPORATION

*"Growing Paper on Tree Farms"*

ing for observance and commemoration of the "50th anniversary of the founding and launching of the conservation movement." The proposed celebration in 1957 would be dated from the first conference of state governors, which was called by President Theodore Roosevelt in 1907 to consider conservation problems. A press release issued from the offices of Congressman Frank Thompson, Jr., of New Jersey and Senator James E. Murray of Montana quoted the following from T. R.'s opening address to the governors on that occasion:

"So vital is this question of conservation, that for the first time in our history the chief executive officers of the states separately, and of the states together forming the nation, have met to consider it. It is the chief material question that confronts us, second only, and second always, to the great fundamental question of morality."

Senate Joint Resolution 101 and identical House joint resolutions were introduced during the closing days of the first session of the 84th Congress. They would establish a National Conservation Memorial Commission to be composed of the President as honorary chairman, the president of the Senate and four senators appointed by him, the Speaker of the House and four other representatives appointed by the speaker. This group would elect a chairman and then would expand the Commission membership to include fifteen representatives of national nonprofit organizations dedicated to conservation of various natural resources, plus ten other citizens at large from private life.

The Commission would prepare and carry out a comprehensive plan for observance of conservation's golden anniversary. The resolution further authorizes appropriation of $100,000 for activities of the Commission and provides that the Commission shall cease to exist one year after the observance.

The proposal undoubtedly will be considered by Congress early in the 1956 session.

### J. Hammond Brown Dies

J. Hammond Brown, president of the Outdoor Writers Association of America died in Baltimore, Md., on August 13.

Mr. Brown was widely known for his leadership in the OWAA and for his work in the conservation field. He was associated for over 50 years with the *Baltimore News-Post* and recognized as a leading journalist of his time.

### Forest Service Moving Ahead on New Mining Laws

With a $300,000 supplemental appropriation to help implement its work under the new mining law (Public Law 167), the U. S. Forest Service has issued regulations for the sale of common varieties of sand, stone, gravel, pumice, pumicite, and cinders. Under the new law, these may be sold under the Materials Disposal Act. Formerly they had been available under mining claims. Other minerals on national forests still come under the mining laws.

The Department of the Interior has not yet submitted a supplemental appropriation request for the handling of existing claims on lands under its jurisdiction. A procedure for clearing the record of invalid, abandoned, or otherwise worthless claims has been established by the law. It requires the holding of hearing for any claimant who wishes to retain his interest in the surface rights. If a claimant does not come forth at the hearing, he still retains his subsurface rights, but automatically loses his surface rights.

**CONTINUOUS OPERATION—**

By adopting progressively improving techniques in forest management, logging and milling practices we have established our operations on a continuous production basis with an average annual output of 30,000,000 board feet.

Our selective logging is planned to maintain our lands in perpetual, full production of good timber. Our milling and sales programs are teamed to utilize fully, through conversion to well manufactured lumber and lumber products, our mixed species of Ponderosa Pine, Sugar Pine, Douglas Fir, White Fir and Incense Cedar.

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**J. P. HAMER LUMBER COMPANY, INC.**

*Manufacturers*

**APPALACHIAN HARDWOOD LUMBER**

KENOVA, WEST VIRGINIA

*Supporters of sound forestry programs and cash buyers of mature timber.*

### National Watershed Congress

Final plans for a second National Watershed Congress to focus public attention on the merit of upstream flood prevention through soil and water conservation, forestry, and small dams, have been completed by representatives of agriculture, industry, labor, and government.

The Congress will be held in Washington, D. C., on December 5-6 at the Hotel Statler.

A major purpose of the gathering will be to appraise progress made under the Hope-Aiken law, enacted by the 83rd Congress, which provides for federal cooperation with states and local subdivisions of government in planning and executing watershed treatment programs.

### Susquehanna River Rafting and Logging Day Commemorated

Approximately 1,500 persons attended ceremonies held at Cherry Tree, Pennsylvania, August 20, in connection with the dedication of a granite monument to "The Raftmen—The Loggers—Their Mothers and Wives of Penn's Woods." So far as is known, the monument is the only one of its kind.

Located in Canoe Place Park, the loggers memorial was a gift to the people of the state from R. Dudley Tonkin of Cherry Tree, himself a former raftsman and lumberman, and now writing a book about rafting and lumbering on the Susquehanna West Branch.

Twenty old-timers ranging in age from 85 to 95 years were honor guests. All had once been active in the heyday of logging and rafting.

The monument was accepted for the Comomnwealth by Dr. S. K. Stevens, state historian, who brought personal greetings as the representative of Governer George M. Leader. Dr. A. W. Wallace, of Annville, Pa., editor of *Pennsylvania History* magazine, was master of ceremonies.

### Swift Resigns from Fish and Wildlife Service Post

Ernest F. Swift, assistant director of the Fish and Wildlife Service, has accepted an offer to become executive director of the National Wildlife Federation, effective October 1, in Washington, D. C.

Swift was appointed assistant director of the Fish and Wildlife Service on March 17, 1954.

Prior to joining the Service, Mr. Swift had been associated with the Wisconsin Conservation Department since June 1926, serving as director of the Department from November 1947, until he accepted the federal appointment.

## Private & Industry

### A.P.P.A. Appoints New Community Relations Secretary

Theodore H. Davis has been appointed secretary of the American Paper and Pulp Association's Community Relations Committee. Davis who will succeed D. M. Rochester, deceased, will also serve as secretary of the Association's Press Information Committee.

In his new position with A.P.P.A., Mr. Davis will work with the individual companies and with the national and regional community relations committees in their efforts to improve the industry's "good neighbor" relationships.

With American Forest Products In-

**Swedish Tree-scaling Ladders**

of light metal alloy in sections with chains for securing to tree, to any height desired. For information write to

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5461 KALES AVENUE
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**Southern Pine Seed**

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**TREES & SHRUBS**

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WOODLOT SEED CO., Norway 44, Mich.

**GROW GIANT REDWOODS!**

Send 25c for packet of Sequoia (gigantea) seed. We have conclusive proof that the Sequoia is growing successfully in many parts of the United States. We will include an artistic reproduction of "A California Redwood" and literature describing our Association, dedicated to the greater use of Redwood Trees through scientific experiment and research.

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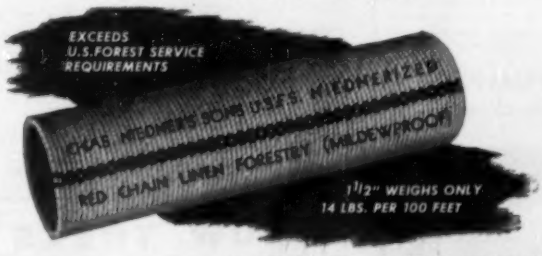
*It Won't Mildew!*

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Red Chain Pure Linen Forestry Hose is *the* lightweight hose to meet severe forest service requirements. Mildew-proofed by our exclusive Niednerizing process for more efficient, longer life. Strong, lightweight, flexible, compact. **Sizes 1, 1½ inch, lengths 50, 100 feet.** Look for the distinctive Red Chain stripe. Send your order to nearest address below for immediate delivery.

*Ask also about Rendein Pure Linen Fire Hose for indoor protection.*

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Tel.: Sutter 1-0618

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Tel.: Main 2341

dustries, Inc., in Washington, D. C., for the previous four years, Mr. Davis worked closely with the paper and pulp industry organizing and furthering industry participation in the Tree Farm and Keep Green programs. Prior to this, he was a forester for the Carolina Division of The Champion Paper and Fibre Company where his activities included wood procurement, land management, and conservation forestry.

During World War II he served as a personnel officer with the Ninth Air Force in Europe. He was relieved from active duty in 1945 with the rank of Major.

Graduated from the New York State College of Forestry, Mr. Davis worked with the Indiana Conservation Department prior to World War II.

He began his activities at A.P.P.A.'s New York offices on August 10

THEODORE H. DAVIS

The Forestry Department at Stephen F. Austin State College is expanding its library facilities to provide a more complete reference source for its students. Many needed publications are out-of-print or unavailable. If you have any publications, *other than back issues of the Journal of Forestry*, the college will appreciate receiving them. Send all material collect, book rate, to **Dr. Nelson T. Samson, Forestry Department, Stephen F. Austin State College, Nacogdoches, Texas.**

## L. T. Marshall Heads M and M California Division

Larry T. Marshall of Arcata, Calif., has been named manager of M and M Wood Working Company's California Timber Division. He will put into operation plans that call for selective cutting, logging to provide natural reseeding of land, development of fire control systems, and the further acquisition of logs and timber.

Prior to joining M and M, Marshall was logging manager of Dolly Varden Lumber Company of Arcata, Calif. He is a graduate of the Oregon State School of Forestry.

## Ron Richardson Joins Crown Zellerbach Corporation

Ron Richardson has resigned his dual position of assistant managing director and editorial director of American Forest Products Industries, Inc., to accept the position of assistant to the director of public relations, Crown Zellerbach Corp., San Francisco. Richardson had been with A.F.P.I. for more than seven years.

C. Edward Stout was named assistant managing director and Franklin Bradford editorial director.

## Wm. S. Brenneman Accepts New Position

Wm. S. Brenneman has resigned his position as forestry assistant with Consumers Power Company to accept the job of forestry representative of the Illinois Power Company at Decatur, Ill.

In his new position, titled Forestry Representative, he will be concerned with improved construction and maintenance practices of the power company for the preservation and care of trees along the rights-of-way.

Mr. Brenneman is a graduate of the New York State Ranger School and Michigan State College where he received his B. S. degree in 1948.

## Minnesota and Ontario Paper Co. Fellowship Awarded

The Minnesota and Ontario Paper Company's annual Forestry Research Project award went to John R. Jones this year, according to Dr. Frank H. Kaufert, director of the University of


3 FORESTER'S WORKHORSES
With Excellent Performance

HALE Portable Pumping Units

| | U. S. Gallons Per Minute | Disch. Press. Lbs. Per Sq. In. |
|---|---|---|
| FZZ | 60<br>100 | 90<br>70 |
| FZ | 50<br>300 | 60<br>10 |
| *HPZF | 11<br>45 | 200<br>100 |

*New unit

These 3 Centrifugal pumping "Workhorses" provide a remarkable range of volumes and pressures for efficiently fighting a wide variety of fires. All three units are conveniently portable by two men; can be easily mounted or carried on any type of apparatus or truck for fighting fires while in motion from booster tank; often used to pump from

inaccessible water source into major pumper, or to fight fires direct through long line of hose.

*Write today for circulars on Models FZZ, FZ and HPZF—at least one of which is sure to meet your fire fighting requirements. Ask for demonstration; no obligation.*

HALE FIRE PUMP CO.
Conshohocken, Pa.

*Below—HPZF shown in action.*

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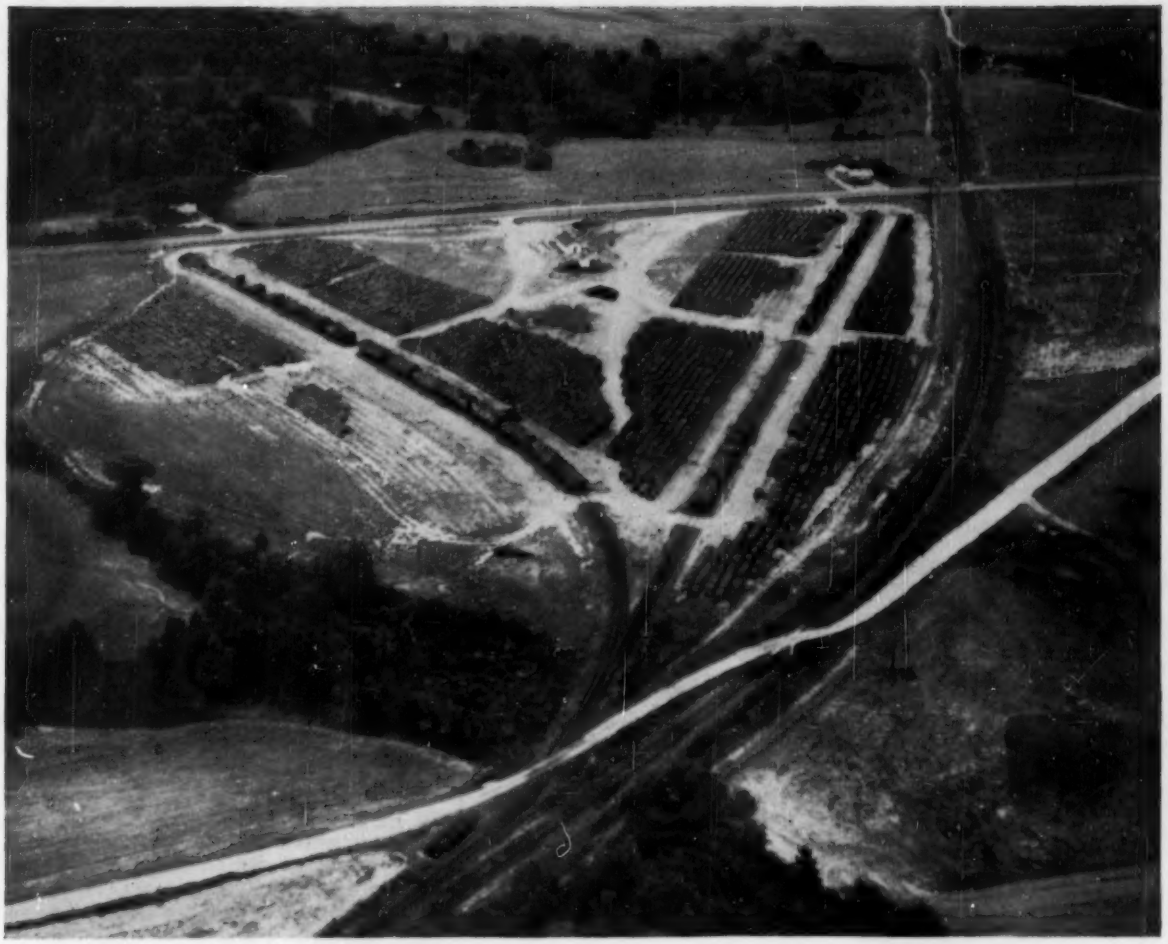

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The greatest incentive towards good forestry practice is a reliable market for wood. To encourage farmers to grow trees as a regular crop, International Paper Company has built over 60 local wood "markets" right in the heart of the forest growing areas of the South. Here, small landowners can sell their wood close to where it grows, saving the time and expense of long hauls to the mill.

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Minnesota's school of forestry.

An honor graduate of the Michigan State College of Forestry, Jones received the award for the second year in a row.

Mando's graduate fellowship is in its ninth year and provides $1,500 for concentrated studies of forestry problems meriting special attention. The project is under the supervision of Dr. Otis Hall.

This year's fellowship, Dr. Hall said, is to be used to study logging damage to small trees and means of reducing such damage and the growth response of trees released by thinning operations.

## Government

### A. J. Jaenicke Retires

Alex J. Jaenicke retired July 31 after more than 42 years with the U. S. Forest Service.

Jaenicke's career has covered almost the entire span of the Forest Service, as he received his permanent appointment in 1912, seven years after the Service was formed. He is best known for his work in the Pacific Northwest to which he was transferred in 1916 from the Southwest.

He was one of ten persons in the nation and Canada in the professional conservationist class who received the 1955 Nash Motors Conservation Award, made for his accomplishments in the field of forest insect control.

Regional Forester J. Herbert Stone states that Jaenicke has participated prominently in nearly every large-scale forest insect control program in the

A. J. JAENICKE

West. From 1949 to the time of his retirement he was in charge of the Forest Service activities connected with the cooperative aerial spraying operations directed at the control of the spruce budworm epidemic which threatened extensive areas of Douglas-fir and white fir forests in Oregon and Washington. Under this operation almost four million acres have been successfully treated to date. He is also widely known for his contribution to the development of timber cutting practices, particularly in ponderosa pine forests. To a considerable degree, through his efforts what has become known as a "sanitation-salvage" selective cutting in ponderosa pine stands has been perfected.

Jaenicke graduated from the forest school at Pennsylvania State University in 1912 and completed an additional year at Cornell University.

### Oregon Dedicates George T. Gerlinger Experimental Forest

Oregon foresters, lumbermen, conservationists, and public leaders gathered at the Black Rock Guard Station, Oregon State Board of Forestry, on August 25 to dedicate a 1,000-acre state experimental forest in memory of the late George T. Gerlinger.

Called the father of Oregon's famed state forestry program, Gerlinger served for 30 years as a member of the state board of forestry and exerted forceful leadership in developing the state's program. He was also president of the National Lumber Manufacturers Association and was for years vice president and chairman of various committees for the West Coast Lumbermen's Association. His Black Rock and Snow Peak Tree Farms were among the first certified in the nation.

The newly dedicated state forest has been set aside as a laboratory in which to determine the effect of thinnings on a 40-year-old stand of Douglas-fir in a long time project that will be continued until the residual stand is finally harvested.

### E. L. Little on British Guiana Mission

Elbert L. Little, Jr., dendrologist in the Washington office, of the U. S. Forest Service, left July 29 for a three months' assignment in British Guiana. As botanist-ecologist he will work with a soil survey group of the University of Maryland, mapping vegetation and soils in areas to be developed for agriculture. This University of Maryland mission is under the International Cooperation Administration, technical assistance section in agriculture. The program is directed toward the agricultural, economic, and social development of the region. Dr. Little has had four and one-half years' experience on several assignments in tropical America, beginning with the Forest Service wartime surveys in Ecuador and Costa Rica in 1943 and including three years in South America.

### Forest Service Activities in Puerto Rico Reorganized

Under date of July 5, all activities of the Forest Service in Puerto Rico and the Virgin Islands were consolidated under the Tropical Forest Research Center. This reorganization is in line with a change in orientation of program. In the future, the primary emphasis will be on research. Included will be the intensive pilot operation of the Luquillo Experimental Forest (Lu-


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quillo National Forest land), and the testing and demonstration of research findings. To the extent possible the latter will be augmented through the use of State and Private Forestry cooperative projects. The entire program will be directed toward solving forestry problems of Puerto Rico and the Virgin Islands. Inescapably, however, the results will have application in various other Caribbean areas and to other tropical countries. They will, accordingly, be helpful in training programs undertaken in Puerto Rico for the benefit of other countries.

Dr. Frank Wadsworth, research center leader, who has been actively engaged in research work in this area for nearly 14 years, will be in charge of the reorganized unit. Mr. I. Pat Murray who has had charge of national forest and S. and P. F. activities for the past two years is being transferred to the Division of Range Management, Region 4, Ogden, Utah.

### First California Classified Scenic Area Established

Clare Hendee, regional forester of the U. S. Forest Service in California, has announced the establishment of a special area dedicated to scenic recreation in Tuolumne County to be known as the Calaveras Memorial Scenic Area. This is the first such dedication of national forest lands in California to be administered for the exclusive purpose of preserving scenic recreational values.

The area, recently acquired by exchange from the Pickering Lumber Co., consists of 378.7 acres of the finest stand of veteran sugar pines remaining in the state. Intermingled are the associated pines, firs, and cedars, and a few giant sequoias that make up the typical virgin forest in that part of the Sierra. It will be maintained in an undisturbed condition; the only development permitted will be a minimum of foot trails.

The area is adjacent to the Calaveras South Grove Big Tree State Park.

### $80 Million Collected in Year from National Forest Resources

More than $80 million from the sale of timber, grazing permits, and other land use was deposited by the U. S. Forest Service in the federal treasury during the year ending June 30, 1955.

This sum ($81,137,294.18), an all-time record, was due largely to an increase in timber sales in turn credited to the stepped-up program of building access roads.

The 1955 record compares with $68,992,686.38 taken in during the previous year, and $76,505,198.67 collected in the year ending June 30, 1953, the next highest record year.

Largest source of income was national forest timber which brought in $73,186,590.15 in 1955 as compared to $61,288,630.51 a year ago. Receipts from grazing of livestock on national forests totaled $2,953,700.91 in 1955, a drop from the $3,107,172.23 collected in 1954. Fees from special uses of the forests such as summer homes, resorts, rights-of-way, water rights, and minerals were $1,524,376.20 in 1955 and $1,310,859.76 in 1954.

Income from land utilization areas under federal administration by authority of the Bankhead-Jones Farm Tenant Act of the 1930's was $1,616,413.83 in 1955 as compared to $1,772,707.40 the year before.

### Smokey Bear Has New Director

William W. Huber, who has been on the staff of the regional forester of the Pacific Northwest Region of the Forest Service during the past five years has been named director of the Smokey Bear Forest Fire Prevention Campaign. He succeeds Clint Davis, recently named head of the Forest Service Division of Information and Education, who directed the Smokey Bear work for nine years.

As director, Huber carries out the policies decided upon by the state foresters, federal Forest Service, and The Advertising Council, cooperating sponsors of the campaign. Huber received his B.S. degree from the New York College of Forestry in 1932. He started working for the Forest Service the following year.

### Oregon Continues Lead in Timber Production

Oregon loggers harvested 8,860,735,000 board feet of logs in 1954 to lead all states in timber production according to a report by State Forester George Spaur. It was the second largest volume of timber ever cut in the state. The highest all-time mark was established in 1952 when 9.8 billion board feet of timber was reported. Spaur indicates this as the seventeenth consecutive year Oregon has maintained national leadership in the harvest of timber. The 1954 figure exceeded the 1953 output by 273,000,000 board feet.

The timber was removed from 1,167,380 acres of forest lands. Relogging and salvage operations were conducted on 717,000 acres and 449,000 acres were cut for the first time.

More intensive manufacturing processes, expanded production of plywood, pulp, and new uses for wood, combined with steady markets, were cited as reasons for the increased salvage of materials left in the woods by earlier operations.

The harvesting and processing of wood are ranked as Oregon's top industry, with an annual income of approximately $1 billion. More than 108,000 loggers, millworkers, machinists, truckers, and other skilled persons were employed to produce the forest products.

### A. P. Dean Visits Mexico

A. P. Dean, chief of the Division of Engineering in the Washington office of the U. S. Forest Service, attended the Sixth General Assembly of the Pan-American Institute of Geography and History, held in Mexico City July 25—August 2. He was official representative from the Department of Agriculture.

Of particular interest were the coverage of such subjects as topographic maps, aerial photogrammetry, and special maps including the subject "New National Atlases." Special subject relating vegetation and geography in the tropics were discussed. Dean is a member of the National Academy of Science's Committee on the National Atlas for the United States.

### Sale of Timber in Tongass National Forest Will Give Alaska Third Pulp Mill

Alaska's third pulp mill will result from granting of a preliminary award to the Georgia-Pacific Alaska Corporation of seven and one-half billion board feet of timber in the Tongass National Forest in southeastern Alaska, according to the U. S. Department of Agriculture. The award was made following formal receipt of bids by the Forest Service in Juneau August 17.

The Georgia-Pacific Alaska Corporation, a subsidiary of the Georgia-Pacific Plywood Company of Portland, Ore., bid $2.80 per thousand board feet for Sitka spruce and $1.70 per thousand board feet for western hemlock

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and cedar. The Forest Service estimates that if this rate of payment continued throughout the 50-year sale period, $15 million would be added to the federal treasury.

Because it is a long-term timber sale, rates will be redetermined on January 1, 1971 and every five years thereafter to keep them in line with prevailing prices. Contract requirements will keep this long-term harvest in line with the sustained yield program of the Tongass.

The timber sale contract calls for the construction of the pulp mill in the vicinity of the sale area. It will process at least 100,000,000 board feet of timber a year. By 1981 the minimum annual requirement will be 160,000,000 board feet. The timber is located in a 500,000 acre area in the vicinity of Admiralty Island and the southern end of Lynn Canal. Principal nearby communities are Juneau and Douglas.

This Juneau sale is the third large pulp sale in the territory. The first for eight and one-quarter billion board feet of timber was made to the Ketchikan Pulp Company in 1948. Its $50 million pulp plant has been in full scale operation for more than a year. The second, for approximately three billion board feet was made last year to the Pacific Northern Timber Company, at Wrangell.

### Increased Winter Sports Use Noted in Oregon and Washington

A total of 658,650 winter sports visitors were attracted to the winter sports areas on the 18 national forests of Oregon and Washington during the past season according to figures compiled by the U. S. Forest Service. This represents a gain of about 57,000 more visitors than the previous season and is approximately a 10 percent increase.

Winter sports use is now the third largest recreational use of the national forest recreation areas, surpassed only by camping and picnicking use.

### W. T. Ahearn Heads I&E in South Carolina

Walter T. Ahearn has been named assistant state forester in charge of information and education activities of the S. C. State Commission of Forestry, State Forester C. H. Flory has announced.

Ahearn was promoted from his position of information and education assistant at the Forestry Commission's headquarters in Columbia, where he has served more than 5 years. He replaced John C. Witherspoon, who resigned recently to accept a position with American Forest Products Industries, Inc. of Washington, D. C.

Ahearn received his B.S. degree in forestry at the New York State College of Forestry. He served in the Pacific during World War II as an officer in the U. S. Marine Corps, and upon his discharge in 1946 joined the S. C. State Commission of Forestry.

### Forest Supervisor Shift on Black Hills National Forest

Jack Kern, supervisor of the Black Hills National Forest with headquarters at Custer, S. D., has accepted an assignment as head training officer for the Forest Service in Washington, D. C.

Kern entered the Forest Service in 1934 as a junior forester on the Angeles National Forest in California and

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has served in numerous capacities. He became forest supervisor at Custer in February 1953. He served with the Navy for two years during World War II.

In his new position, Kern will be responsible for leadership in and coordination of the in-service training programs throughout the national forest system.

Grant Morse, supervisor of the Targhee National Forest with headquarters at St. Anthony, Idaho succeeds Kern as supervisor of the Black Hills Forest.

### Lake States Station Appoints Fire Research Man

Lloyd La Mois has been appointed to the staff of the Lake States Forest Experiment Station, M. B. Dickerman, director of the Station announces. La Mois will carry on the fire research part of the Station's program. Much of the future research effort will probably be directed toward a study of the effects of fire and its possible uses as a tool for forest management.

A veteran of World War II, La Mois has been teaching for the past three years and previously was employed by the Division of Forestry of the Minnesota Conservation Department. In 1952 he obtained his masters degree from the University of Minnesota.

### L. C. Hermel Named Supervisor Superior National Forest

The Superior National Forest's new supervisor is Louis C. Hermel, according to an announcement by H. Dean Cochran, regional forester for the North Central Region of the Forest Service at Milwaukee, Wis.

Before assuming this position, Hermel was supervisor of the Chippewa National Forest with headquarters at Cass Lake, Minnesota. He replaces Galen W. Pike who recently passed away. Pike was an outstanding figure in the fight to preserve the wilderness characteristics of the Roadless Area on the Superior.

Hermel graduated from Michigan State College, obtaining a B.S. degree in forestry in 1930. He entered Forest Service employ in May 1933.

The Superior is one of the largest national forests in the country. It was established in 1909 and now has a net area of over 2,100,000 acres. The forest is famous for its wilderness areas which, with the Quetico Provincial Park in Ontario, Canada, has the most extensive canoe country in the world. The forest has the biggest timber cut in the region, harvesting over 92 million board feet of forest products last year. Over 85 percent of the cut was for pulpwood, or about 195,000 cords of jack pine, spruce, and other species.

### B.L.M. Personnel Changes

Gerald F. Horne of the Salem, Ore., office of the Bureau of Land Management, has been named assistant forestry staff officer in the Washington, D. C., office of the Bureau. He succeeds Virgil T. Heath who has been named state supervisor for B.L.M. in Oregon.


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### Thomas Lommasson Retires

The retirement of Thomas Lommasson, U. S. Forest Service range conservationist, was announced in August by Regional Forester P. D. Hanson.

Lommasson received his B.S. degree in forestry from Montana State University. On July 31st he completed more than 35 years of service with the Forest Service and has a long record of work in range management activities. He received his permanent appointment in 1920 in the Intermountain Region, following service overseas during the first World War. Shortly thereafter he transferred to the Northern Region headquarters in Missoula and has been stationed there since that time.

Lommasson received a Superior Service Award in 1952 from the Secretary of Agriculture, Charles F. Brannan, for outstanding government service, for his original work in the development and application of range inventories and management plans, and for exceptional achievements in training men in these fields.

## Education

### L.S.U. Forestry School Adds Staff Members

Four recent additions to Louisiana State University's School of Forestry have been announced by Director Paul Y. Burns.

Appointed as associate professor of forestry was William C. Hopkins, who formerly taught in the forestry department at Mississippi State College. He is replacing Arne K. Kemp, who left L. S. U. to head the Department of Forestry at Stephen F. Austin State College in Nacogdoches, Tex.

Charles B. Briscoe who received his bachelor's and master's degree at L. S. U., has been appointed assistant professor.

Also named assistant professor was Cedric T. Sidney, who will serve for one year. He replaces Professor Martin B. Applequist, who will be on sabbatical leave during this time. Sidney received his Master's degree from Duke University in 1948, and served as a staff forester for the Louisiana Forestry Commission before coming to L.S.U.

The fourth appointment was that of James L. Chamberlain who was named to the game management staff of the School of Forestry as research associate.

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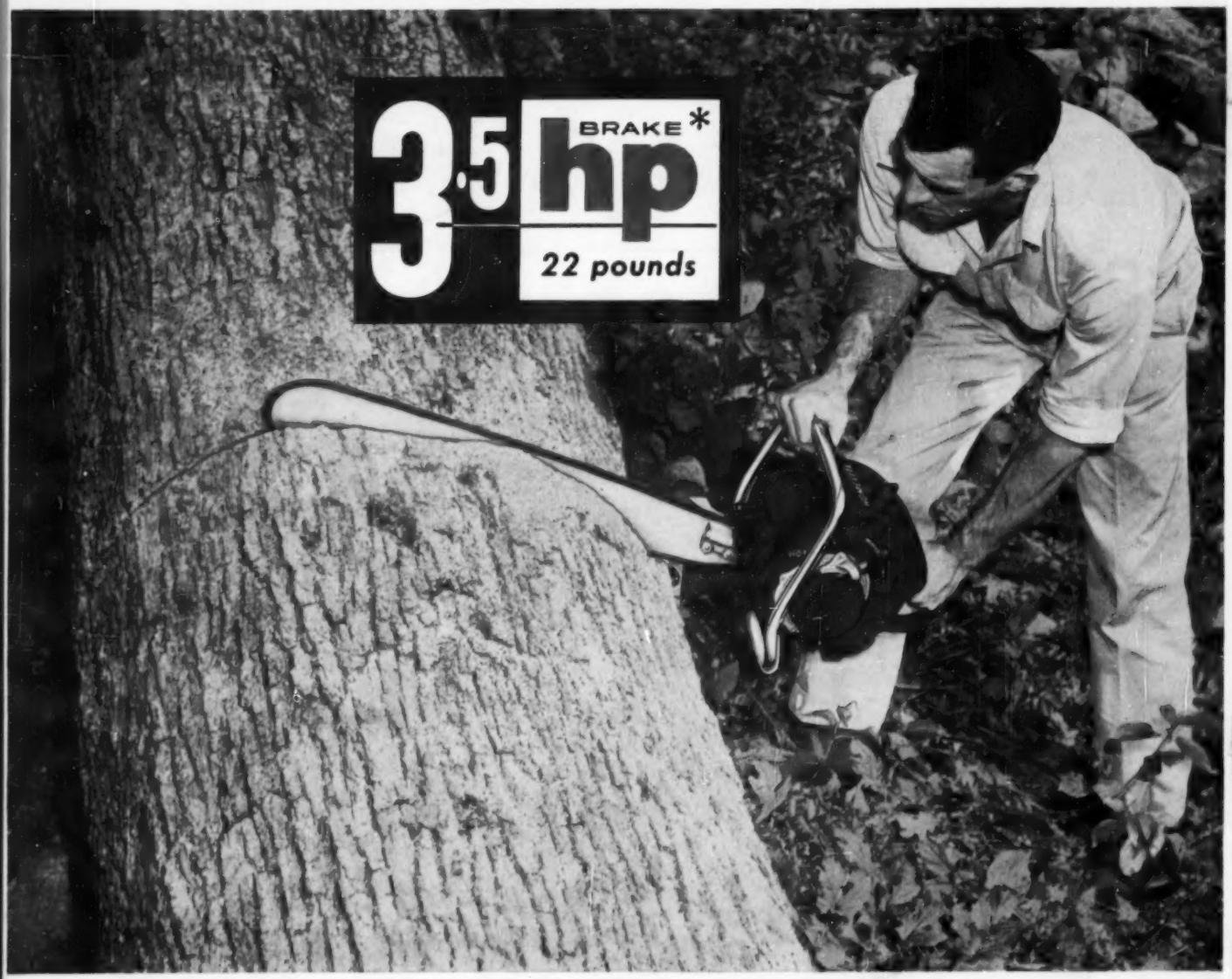


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